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## CANCER\*

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NUMEROUS enterprises have been undertaken for the control of cancer in recent years. In various parts of the world an enormous amount of activity has been expended upon different phases of the problem. In the field of research no other disease has been exploited to the same extent, in the endeavour to determine the cause, the life history, and the most efficient method of treatment. Are the results attained in these enterprises commensurate with the enormous amount of energy, time, and money expended upon them? Some of the best talent available in science and medicine has been engaged in these pursuits. Much progress has been made, resulting in a great accession to our knowledge concerning many aspects of the problem. Both in the research laboratory and in the clinic studies have gone forward that have given us much valuable information as to the cause, the clinical course, and the treatment of cancer. Unfortunately, we are far from the delectable goal of determining a specific cause. In fact, some investigators have suggested that we are not dealing with a single specific cause, but that cancer may be polygenetic. We have an undoubted relationship between chronic inflammation, due to a great variety of irritants, and the production of cancer. This has been shown in oral cancer caused by the irritation of jagged and infected teeth or by the chewing of the betel nut mixed with lime in India; in the cancer of the bladder of those working with aniline dyes, and in the gall bladder where

cancer is induced by the irritation of gallstones. In the early days of the introduction of the x-ray, and before the danger of exposure to the rays was known, many fell victims to the peculiar type of squamous-celled carcinoma induced thereby. Heat applied to the skin may cause cancer, as in the use of kangri basket by the natives of Kashmir who use this basket, heated by charcoal, in close contact with the skin in order that they may withstand the intense cold. It has long been known that workers in coal tar and its derivatives may contract cancer, and these substances have been used in its experimental production in animals. Chimney sweeps' cancer is probably of this category. Chronic arsenical poisoning may be associated with cancer. Bacteria would appear to play a rôle in the production of most pre-cancerous conditions. From these observations it is evident that the predisposing causes of cancer are many, including mechanical injury, infection, chemical agents, and such physical irritants as the x-ray and heat. It is further suggested that it may be produced by over-exposure to the ultraviolet rays of the sun.

There is a marked variation in the readiness with which different individuals develop cancer after exposure to conditions known to induce it. The part played by heredity in this connection has been the subject of much investigation. Miss Maud Slye has demonstrated in the laboratory the hereditary transmission of cancer in white mice. But, as the result of her studies, she concludes that "there are apparently two factors necessary to produce cancer; first, an inherited susceptibility to the disease, and second, irritation of the right kind and

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in the right degree applied to the cancer-susceptible tissues". These experimental findings would seem to support conclusions regarding the production of cancer in human beings of a character similar to those that have been determined after intensive clinical study. Two factors are necessary, namely, first, the specific irritant, secondly, the structural or physiological peculiarities of the organ that have been acquired by heredity. The absence of either factor would prevent cancer. Hence, if this be true, a very large number of people are wholly immune. The problem, however, would appear to be much more complex; final disposition has not been made of it. Thus we find Ewing saying that "The susceptibility to cancer is widely distributed among men and women, who will generally acquire cancer if subjected to the proper exciting factors, and hereditary tendencies for and against cancer may be altered by environment."

Whatever view may be taken regarding the part played by heredity in the production of cancer, it becomes obvious that this factor may be ignored. It is beyond our control. In the other hand our energies should be concentrated on the other factor, equally essential for its manifestation, and that is, environment—using that word in a broad sense to include the exposure to irritants, mechanical, chemical, physical, etc., that are known to induce cancer in various regions of the body.

The prevention of cancer is perhaps not sufficiently stressed in our campaign to combat the malady. If trauma, the result of irritants, can be prevented, the tissues will remain normal and cancer will not develop in normal tissues. Therefore, we should control the situation wherever possible. Thus we should avoid all forms of irritation in the oral cavity and on the lips. Adequate dental care is necessary, and all forms of trauma to the mucous membrane must be avoided. Trauma of the breast should be prevented, because even slight injuries in individual cases, where there is susceptible breast tissue, may result in cancer. It is unlikely that the normal function of the breast in lactation has any effect in subsequent malignant development. In fact, although more married woman than single suffer from breast cancer, yet there are more married women of cancer age in the world than single women. Taking this fact into consideration it has been

shown that cancer of the breast is more common among single than among married women.

Operation may be necessary as a measure of prevention, such as the removal of gallstones, the repair of an unhealed laceration of the cervix uteri in women who have borne children, the extirpation of warts and pigmented moles, and the removal of abnormal lumps in the breast or other portions of the body, etc., etc.

In proper sequence we should now consider the diagnosis of cancer. In particular, one would stress the essential importance of being able to make a diagnosis in the early manifestations of cancer. Amid the enormous array of experimental and clinical data that has been accumulated from investigations in the laboratory and at the bed-side one fact stands out pre-eminently, conveying hope to the patient and a challenge to the skill in diagnosis of the medical attendant; I refer to the established fact that if cancer is recognized sufficiently early, while it is still a local disease, it may be cured by appropriate treatment. Of recent years an attempt has been made to interest the laity regarding manifestations of disease in various parts of the body that may portend early cancer growth, and of the great importance of consulting a medical attendant without delay. Propaganda of this character has undoubtedly been the means of saving lives. Patients suffering from cancer come under observation at a much earlier phase of its development, and cures result.

The responsibility of the medical man in the diagnosis of early cancer is paramount. Many cases will test the skill and resourcefulness of the practitioner to the limit. Large hospitals afford an opportunity for the study of a great number of cancer patients, but in smaller communities and in country districts comparatively few cases come under observation. It therefore becomes the duty of competent men in larger centres and of wide experience to disseminate knowledge regarding early diagnosis. In Canada a great deal of this work has been done by the Canadian Medical Association through the agency of post-graduate lectures. By this means the significance of symptoms and the local signs of disease are taught, including the technique of a local examination and the principles involved, such as the necessity to handle suspected growths (*e.g.*, in the breast) with the greatest gentleness, because both clinically and experi-



mentally it has been proved that massage (or rough handling) of a lump may disseminate cancer through lymphatic channels. In no case should the diagnosis be left in doubt; whatever means are necessary to confirm the diagnosis should be undertaken. Failure to recognize an early cancer may prove to be an error fatal to the patient.

The discussion of the appropriate treatment for cancer is a subject fraught with difficulty because of the room that exists for great divergence of opinion. Surgery and radiology, singly or combined, are the two main agencies employed today to effect a cure. The type of treatment must differ, having regard to the locality of the cancer growth (easily accessible or otherwise), the extent of the growth, whether it is operable or inoperable, and the general condition of the patient. As a surgeon, one finds that the excision of an early cancer without secondary developments will result in a cure in a large number of cases. A similar claim is made for radium, more particularly in those cancers that develop on the surface of the body, the skin and the mucous membrane adjacent to the body orifices.

Both surgery and radiology are dangerous weapons in the hands of those who are not expert in their use. The surgeon aims at complete extirpation of the cancer growth: this involves sound judgment and the development of an effective technique. The radiologist has a very complex problem demanding a knowledge of the physical properties of the x-ray and radium and the effect of radiation upon both the cells of the tumour and the normal cells of the tissues. He must also determine the adequate dosage necessary to effect a cure.

Radium has a very profound effect upon the growth of the cancer cell. It is hoped that its usefulness will vastly increase with a wider knowledge of its capabilities, and with a more exact determination regarding the most effective method of application within the margin of safety. Much progress has been made in the field of radium therapy since its first employment. Much progress is still necessary to reach the ideal goal. Finality has by no means been reached in our investigations. This may be well illustrated by quoting from the last annual report (1933) of the British Empire Cancer Campaign where the following statement occurs:—

A great deal of very difficult research work is necessary to ascertain the best way of calculating the dosage of radium necessary, and in finding the best and most effectual manner of applying it, in guarding against accidents and complications when using such a dangerous and potent substance, and in trying to discover exactly how the effects are produced.

One branch of research aims at discovering at which stage in the life history of the cancer cell it is most readily destroyed by the action of radium.

There are a great many problems connected with the use of radium and x-rays, which still urgently require to be worked out in order to render this method of treatment of cancer safer and more effectual.

As a rule you will find that the man who has had wide experience in the use of radium, and who has acquired an expert knowledge of its physical properties and its effect upon both the cancer cell and the normal tissue, will be most conservative in his claims as to its value in cancer treatment. But this is not invariably the case. Unfortunately an impression has gone abroad that the radiologist in his enthusiasm occasionally makes unwarranted claims as to the efficacy of radium in eradicating cancer and effecting a cure. There can be no doubt of the fact that in radium we have a most potent weapon for our fight against cancer, but its place in our armamentarium is not yet definitely settled. We believe that its value should be assessed, not solely by the radiologist, nor yet by the surgeon, nor by the physician, but by a group composed of the radiologist, the physician, the surgeon, and the pathologist, together with the physicist and biochemist. In fact, we urge that such a group should control the activities of a radiological department. They should be active in confirming diagnosis, approving of the particular method of treatment, and finally in assessing the results. Their findings would be reached apart from all prejudice or individual bias, entirely free from any suspicion that might apply to the individual, who, however honest his conviction, may arrive at opinions prematurely and with an unwarranted optimism. By such means the radiologist reaps an inestimable advantage. With the cooperation, the support and the entire approval of the representatives of all branches of medicine, he advances on firm ground, and will secure and retain the confidence of the profession.

In a "Lecture on Cancer with Special Reference to Early Diagnosis" (*Brit. M. J.*, 1934, 1: 881) Mr. Roy Ward, Medical Director and Surgeon to the Radium Institute, London, has

this to say regarding surgery and radium and x-ray therapy:—

Our present methods of treatment are admittedly inadequate. In November last, at the Royal Society of Medicine, Professor Gask stated that a general survey of figures led him to conclude that the best we can expect either from surgery or from radium is a five-year survival rate of 20 to 25 per cent for tongue cancer, and 40 per cent for uterine cancer. Hintze reported a five-year survival rate of 34 per cent following the treatment of 5,500 cases of carcinomata of all kinds at the surgical clinic at Berlin. This group included 836 skin cases, in which the results of treatment are extremely good; without these skin cases the percentage would be considerably lower.

Despite our gradual progress towards the goal, variously defined as the discovery of the cure or of the cause of cancer, it is still impossible to tell how near that goal is or how long it will be before we reach it. When it is reached it may be that all our present methods will be proved wrong, and that they will have to be discarded. One often hears that those methods are obviously wrong, mainly because they are local weapons against a general disease. Nevertheless, they are the best we have, and the goal being an unknown distance away we must meanwhile make every effort to use them as efficiently as possible. The problem of cancer treatment is the problem of getting the most out of unsatisfactory methods. Early diagnosis, in which the patient's help can and should be secured, and close cooperation, which is a matter for the medical profession, are certainly possible. There are obstacles in the way of both these things, but I feel as certain that those obstacles are not insuperable as I am that advance will be held up while they are allowed to remain.

The death rate from cancer has increased to an alarming extent in the last decade. It now ranks second only to diseases of the cardiovascular system as a cause of death. In the Province of Ontario, during the period from 1923 to 1932 inclusive, the number of deaths from cancer (in both sexes) has steadily increased. The rate per 100,000 of the population has risen from 90.0 in 1923 to 110.0 in 1932, an increase of 23 per cent. Taking the statistics for all Canada, we find that from 1923 to 1932 the number of deaths per 100,000 of the population had risen from 73 to 96, an increase of 33 per cent. The increase in mortality rate has been continuously progressive for many years. This fact is emphasized if we take the statistics for Ontario over a period of 20 years. In 1914 the death rate per 100,000 of inhabitants was 69; in 1933 it was 113, an increase of no less than 59 per cent, as compared with the increase, quoted above, of 23 per cent in the last decade. In 1932 there were approximately 125,000 deaths from cancer in the United States, and upwards of 60,000 in Great Britain, and it is stated that on the continent of Europe certain figures representing cancer mortality reach as high as 145 per 100,000 inhabitants, an

increase of nearly 30 per cent over the highest rate quoted for the Province of Ontario.

We are apt to think that cancer is most common among persons of both sexes in the fourth and fifth decades of life. It is true that more cases of cancer are registered at that period of life than at any other, but more people are alive from 40 to 60 years of age than, say, from 60 to 90 years of age, and we find that in proportion to the number of people alive at various ages the tendency to cancer increases progressively as the individual grows older. This is made clear if we take the statistics for one year (1931) for all Canada, showing the death rate from cancer per 100,000 of individuals alive at different ages. The figures are as follows:—

Under 30 years of age	4
30 to 39 years of age	27
40 to 49 years of age	93
50 to 59 years of age	233
60 to 69 years of age	491
70 to 79 years of age	882
80 years and over ....	1,137

There is no doubt of the fact that the older the individual the more liable he is to develop cancer. This fact has a marked bearing on the increased mortality in cancer, because more people live to be over 60 years of age than ever before and the death rate from cancer in these old people is very much higher than in persons, say, from 40 to 60 years of age. In fact, in a communication published in the *British Medical Journal* of May 12, 1934, a paper by Dr. S. Peller (*Zeit. f. Krebs.*, 1934, 40: 465) is quoted in which he states that there is an actual diminution in the incidence of cancer in the age groups up to 60 years, and only the group over 60 years shows an increase. This is not true for Canada, but it is a fact that the great increase in cancer mortality in this country is in people over 60 years of age, as seen by the following statistics compiled for the registration area in Canada, showing the rates per 100,000 of the population,—

	1921	1931
40 to 49 years of age	85	93
50 to 59 years of age	210	227
60 to 69 years of age	451	474
70 to 79 years of age	773	873
80 years and over...	856	1,158

No doubt there are other factors operating to increase the rate of mortality in cancer. Fourteen years ago I reported two cases of carcinoma of the appendix in sisters, both of

whom were tuberculous, and I suggested at that time a possible relationship between tuberculosis and the etiology of cancer. In my address as President of the American Surgical Association, in 1931, I referred to the work of Sampson Handley, who showed twenty-five years ago that cancer spread by lymphatic permeation, and more recently he has concluded from experimental and clinical evidence that lymph stasis plays an important rôle in the etiology of cancer. He believes that the obstruction must last twenty to thirty years to produce cancer. He also observes that tuberculous processes tend to produce lymph stasis, and cites lupus erythematosus as an example, in which after lymph stasis we may have papillary hypertrophy, definite papillomata, and ultimately cancer. He also quotes some interesting observations of Dr. Thomas Cherry, of Melbourne, who ascertained, statistically, that, whereas during the last thirty years the death rate from tuberculosis has greatly diminished and that from cancer has greatly increased, the combined death rate from tubercle and cancer together has remained at a constant level. One may add that Handley does not mean to suggest that tuberculosis is the sole cause of chronic lymphangitis; it might be produced, for example, by syphilis or possibly by some members of the pyogenic group of infective agents.

Tuberculous invasion of the Fallopian tube may simulate carcinoma in its histological picture. Thus Barbour and Watson, in studying tuberculous pyosalpinx, found that, while the tubercle nodules were confined to the mucous membrane, there had been a hypertrophy of the epithelium which penetrated deeply into the muscular layer, together with the formation of strands and masses of epithelial cells in the substance of the mucosa. This produced "an appearance very like carcinoma". Further, at the extreme ends of the tubes they found the mucous membrane free from tubercles, but there existed marked hyperplasia of the epithelial covering and a deeper extension into the muscular wall. Embedded in the muscle were gland-like spaces lined by epithelium at a considerable distance from the lumen. It is possible, therefore, that a definite relationship exists between cancer and tuberculosis, and that the great saving of life in tubercle may have as its counterpart an increased number of victims of cancer. In any

case the cures from tuberculosis leave a large number of people alive at the cancer age, and so account in part for the increased morbidity.

Another consideration may be stated. The span of human life is longer than formerly; the average has advanced probably a full decade in recent years. Further, infective disease causing death is not so common among aged folk; hence they are more likely to die of cancer, to which they would appear to be more vulnerable than younger people.

A certain percentage of the increase in mortality rate is undoubtedly, also, accounted for by greater precision in the registration of deaths and by greater accuracy in the diagnosis of cancer.

For various reasons, therefore, the statistical records showing a very great increase in the mortality rate of cancer may indicate a situation to some extent more apparent than real. Nevertheless, we cannot close our eyes to the fact that cancer is unquestionably on the increase. We must strengthen our effort to fight this dire enemy of humanity with all the resources at our command. Our knowledge about cancer has increased, but there are many problems yet to be solved, both from the laboratory and the clinical standpoints.

Cancer is more prevalent among civilized as compared with savage races. Mr. Lockhart Mummery would ascribe this to the fact that civilized man has not been subjected to the law of natural selection for some thousands of years, and has suffered in consequence a diminution of the natural stability of his cell nuclei, and has acquired an abnormal tendency to gene mutation, which he regards as the essential cause of cancer. The more complex the machine, the more unstable it becomes.

It would appear to be the duty of the Canadian Medical Association as a national body, representative of the profession of medicine in Canada, to take an active part in the campaign to eradicate this enemy of mankind from our midst. It is suggested that a body be formed in Canada under the ægis of our association, similar in organization to the British Empire Cancer Campaign. Distinguished patronage should be secured and under some such name as "The Canadian Cancer Campaign", with a carefully selected personnel, we should secure adequate financial aid for the purpose



in view. The cooperation of all groups of individuals engaged in cancer problems throughout the entire Dominion should be sought. By united effort our accomplishment should be a credit to Canada, if we take our legitimate share of the activities in the fight against

cancer that has assumed world-wide proportions. Various countries have undertaken responsibilities of this nature that constitute a challenge to us in Canada to play our part in the struggle to rid humanity of this dread disease.

### CANCER—THE PATHOLOGICAL ASPECT\*

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CANCER is a subject of paramount importance to all who follow medical pursuits. Every practitioner, be he physician, surgeon, pathologist, or radiologist, must stand aghast at the apparently increasing incidence of malignant disease. The lack of exact knowledge as to its etiology greatly limits his ability to advise any prophylactic measures, and, except in the early cases, his chances of adopting successful therapeutic measures. But, consideration of the very large amount of scientific investigation undertaken since the opening of the twentieth century, following the successful homologous transplantation of malignant tumours by Loeb and Jensen, should give a feeling of genuine optimism for the future. Improved laboratory and clinical methods of diagnosis, and the remarkable strides in the development of radiation therapy, have greatly strengthened the hands of those attacking the disease. The hope of successful treatment still lies in the early recognition of the disease, and, fortunately, the patient is presenting himself at a much earlier stage for diagnosis and treatment. This adds considerably to the responsibility of the pathologist, who, studying the early lesions, finds microscopic diagnosis a much more difficult problem than it was at the beginning of the century. At that time cancer was usually seen in its later stages, when the histological picture was likely to be typical in a much higher proportion of cases.

For the purpose of this paper the term "cancer" will be used in a general sense, indicating all forms of malignant neoplastic

disease. It will be impossible to go into any of the innumerable special problems connected with the subject in the time allotted. An attempt will be made to present a general view of the present position of the pathological aspect of the cancer problem, based not on any research on the subject but on the reading and experience incident to fifteen years' service as pathologist to a 500-bed general hospital, in a city with a population of about 150,000.

Cancer is by no means a modern disease. It was known to the ancient Egyptians as early as 1500 B.C., and to the ancient Greeks in the sixth century B.C. Celsus, in the beginning of the first century A.D., was operating on breast cancer. Galen, in the next century, advanced the etiological hypothesis that cancer came from the concentration of black bile. From the fifth to the thirteenth centuries, the Arabian school of medicine practised the use of arsenic, together with surgical removal. From the thirteenth to the fifteenth centuries practically no progress was made, either in the definition of cancer or in its treatment. From the fifteenth to the seventeenth centuries the use of printing and the discovery of the circulation of the blood diffused the knowledge of cancer and enabled many successful attacks to be made on Galen's humoral theory. Paracelsus claimed that cancer was due to minerals in the blood. There were many odd theories and much confusion in the methods of treatment, though diagnosis and differentiation of types of cancer was somewhat improved. In the 17th century the recent discovery of the circulation of the blood, of the red blood cells, and of the lymph vessels, gave a great impetus to the study of cancer. The microscope was coming into use, and the etiological importance of bile was replaced by that

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of lymph. Later, Peyrithe, in Lyons, questioned the lymph theory and discussed cancer and its toxins. German workers advanced various chemical theories. John Hunter returned to the theory that lymph was the basic element in the production of cancer. Other English workers took up the study of the pathological anatomy of cancer. In the early part of the nineteenth century, "The Society for Investigating the Nature and Cause of Cancer" was formed in London. In 1824, the discovery of the achromatic microscope ushered in the period of the histological study of malignancy, and, for a time, the theory that cancer was the result of the proliferation of special cells scattered among normal tissue cells held sway. Rokitsky studied the stroma of tumours and explained the variations in gross appearance. Virchow's "Cellular Pathology" (1860) and his dictum *Omnis cellula e cellula* gave a new direction to the study of tumours. Thiersch, by careful histological study of the epithelium in skin cancer, enlarged this dictum to that of *Omnis cellula e cellula ejusdem generis*, thus emphasizing the fact that cancer always runs true to an original type cell. Other workers verified this conclusion. In 1877 Cohnheim brought out his "embryonic rest" theory, which theory, in the light of extended histological study of the body, still has much to recommend it. Great improvement in the classification of tumours, based on histological studies, took place in the latter part of the nineteenth century. The twentieth century, so far, has been signalized by a tremendous broadening of effort to solve the etiological problems in connection with malignancy, by the use of animal experimentation, and by the study of various carcinogenic substances, most notably tar.

The problem of determining the cause of malignant disease has engaged the attention of medical minds continuously since cancer was first recognized as a clinical entity. The search has never been more intensive than at the present time. Many hypotheses have come forward, but, to date, not one has been able to completely withstand the criticism which at once became focussed on it. The parasitic theory, which held the stage for so long a period, has, for the time being at least, receded into the background. The discovery of Rous, in 1911, that sarcoma of the chicken could be transferred by the injection of cell-free fil-

trates, seemed to point to the possibility of a filterable virus as the etiological factor. This idea was further developed by the work of Gye in 1925, who claimed to have demonstrated with the ultramicroscope such a virus, which virus in conjunction with a so-called "specific factor" brought about malignancy. This work has failed of confirmation. In 1913, Fibiger was able to produce gastric carcinoma in rats by feeding them on the bodies of cockroaches infested by a nematode, which he called *Spiroptera neoplastica*. This was the first successful attempt to produce cancer *de novo*, and is one of the outstanding pieces of cancer research. But in spite of these and many other contributions suggesting various bacteria, protozoa and other parasitic agents, as causal in their relationship to the disease, the weight of evidence is in favour of the view that the parasite, acting as an irritant, initiates some, at present unknown, series of changes in cell and tissue metabolism, and that, as a result of this long-continued irritation, malignant disease develops.

Modern efforts to solve the problem of etiology are at present being directed to the study of the carcinogenic effects of chronic irritation by physical and chemical means. Virchow, in 1863, stressed this factor. The effect of sunlight was seen in the higher incidence of skin cancer in men than in women, having regard to the skin areas exposed to the sun's rays. The early radiologists were found to develop cancer of the hands from constant exposure to the irritating effects of the x-ray, and experimental sarcoma was produced in rats by a group of French workers in 1910. But by far the most hopeful line of investigation of the present day is that which deals with the study of cancer induced by the repeated application of tar. "Chimney-sweep's cancer" had been described in 1775 by Pott, who ascribed it to the chronic irritation of the constant exposure to soot. Many workers used tar applications on various animals without result, and it remained for Yamagiwa and Itchikawa in Japan, in 1915, to produce skin cancer successfully in rabbits by repeated painting with tar. In 1918, Tsutsui succeeded in verifying these results in mice, and, in 1920, Fibiger and Bang, in Denmark, repeated the work of Tsutsui, using mice, and claimed success in 100 per cent of the animals used.

The earlier workers failed because they used such unsusceptible animals as the rat, chicken, guinea pig and dog, whose skins apparently do not react, although sarcomata have since been produced in some of them by injection of tar preparations into the tissues. The skins of the rabbit, mouse and human being have been found to react positively to this carcinogenic agent. Kennaway and his co-workers have recently noted that tar solutions give a fluorescence similar to that of the benzanthrane group, which group was known to include some of the constituents of tar. The use of a compound known as 1:2:5:6 dibenzanthracene of known purity was found to have greater carcinogenic properties than had the tar itself, and, later, one or two other related products, such as benzpyrene, were found also to be carcinogenic. 1:2:5:6 dibenzanthracene is used in a 1/400 benzene solution. The skin is painted twice weekly. Cancer appears commonly after about five months of application. Injected into the tissues, the agent produces a typical spindle-celled sarcoma.

Döderlein describes the process of carcinogenesis in the skin undergoing tar applications. There is first an acute and chronic inflammatory reaction. This is followed by destruction of the hair follicles, a thickening of the epidermis, and the development of skin defects, with a coincident development of papillomata. These papillomata ulcerate and the ulceration gradually becomes the seat of carcinoma about the fifth month. The gradual invasion of deeper tissues, and the formation of distant metastases, together with the typical histological changes, characterize the lesion as "malignant". The evidence of a constitutional effect on the organism is seen by the observation that multiple tumours are common, and that injury to the untreated portions of the skin may induce carcinomatous lesions. The cancer cells exhibit a chromosome behaviour characteristic of malignancy.

The development of the knowledge that one or more definite chemical products can be used to produce malignant disease at will would appear to mark a tremendous advance in the understanding of the disease. It establishes long-continued irritation as a definite factor in its causation. Five months in the life of a mouse would correspond to six or seven years in the life of a human being, and this would

have some bearing on the fact that malignant disease in the human being is much more common in the later decades of life. It definitely weakens the case for a parasitic basis of cancer. Undoubtedly, many other factors have to be considered and evaluated. Some change occurs in the life cycle of the tissue cell, either in its metabolism or in such of its physical relationships as its surface tension and its hydrogen-ion concentration, and variations in these factors may be responsible for the degrees of susceptibility or resistance to carcinogenesis noted by all workers in this field. No other line of investigation appears at the present time to be so hopeful of results in solving the problem of etiology.

It is somewhat difficult to properly assess the value of heredity as a factor in human malignant disease, although the presence of "cancer families" has from time to time been suspected. The problem has received more attention through the medium of animal study, especially in mice, where the generations are sufficiently short to make possible the following up of the research through many generations in a reasonably short time. Maude Slye, using mice of known strains, has made a study of a group of some 40,000, performing autopsies in all fatal cases. She concludes that the incidence of spontaneous tumours in this group is about 1 in 8, that the forms of cancer manifested are similar to those seen in man, and that inbreeding of cancer strains greatly increases the incidence of tumours. She concludes that her results are in accord with Mendelian law, resistance to tumour formation being the dominant characteristic and susceptibility the recessive, and that heredity plays an important part in the occurrence of the disease. In the case of the human being, the familial occurrence of glioma of the eye and of neurofibromatosis suggests the possibility that the hereditary factor enters into the problem.

Experience in the transplantation of cancer suggests that immune bodies may also have a part to play. The clinical observation that malignancy in the very young shows rapid growth, and that in certain cases of older people there occasionally appear to be regressions and sometimes spontaneous cure, can be most easily explained on the ground of the development of immune bodies. Extended studies of the ques-



tion of immunity in cancer are being pursued at the present time.

The neoplastic tumour may be defined as an atypical autonomous growth of tissue cells which are closely related to some of the various forms of tissue cell to be found in the body. This group of cells does not behave in conformity with the other tissue cells in the body, whether or not related to it. The benign neoplasm remains self-contained throughout its life-history, and its component cells tend to assume almost completely the histological characteristics of mature cells. Cancer may be described, pathologically, as the malignant form of neoplasia. Malignancy consists in the exhibition of several qualities, the principal ones being rapid growth, infiltration of surrounding tissue, the formation of distant metastases, and the exhibition of a histological picture in which the cells tend more and more to assume the embryonic type and stress growth and multiplication at the expense of function. This last characteristic is the reverse of what features the normal cell. The effect of this uncontrolled growth on the organism is two-fold. The function of organs involved by the disease is eventually seriously upset, and the degenerative processes which commonly accompany malignant growths which grow beyond a certain size apparently induce a toxæmia which eventually proves fatal to the organism. The organism puts up a varying degree of resistance to the malignant process, depending on the general health, the age, the tissue mainly involved, the type of growth, and upon the imponderable factors of resistance or susceptibility. The tissue reactions usually seen are lymphocytic and eosinophilic increase, and the formation of fibrous tissue, the latter particularly seen in the scirrhous carcinoma of the breast. The balance among all these factors determines the rate at which the disease proceeds, and it is not impossible that the factor of immunity may be the chief one. Malignant disease in the young is commonly very rapid in its growth. Most physicians have seen definitely malignant neoplasms which have become stationary for long periods, and most surgeons and pathologists can recall cases which, while showing all the clinical and histological ear marks of malignancy, undergo spontaneous cure. I have in mind two cases which I consider must be placed in this category. One feels that the

factor of immunity must play an important part in such cases, at least.

In the last analysis, the accurate diagnosis of malignancy must, in the present state of our knowledge, depend upon a study of the histological characteristics of the tumour. There is no immunity reaction as yet of any value, though many have been tried. Studies of the chemical and physical changes in the blood of cancer patients yield nothing of diagnostic value, although recent studies of the H-ion concentration in blood and tissue are suggestive. Gross diagnosis of malignancy should be possible to the well-trained surgeon and pathologist in at least 80 per cent of cases, and microscopic diagnosis in another 10 per cent. The remaining 10 per cent will present difficulties in inverse ratio to the skill and experience of the pathologist.

Histological diagnosis of cancer depends on the study of the cancer cell as such. Its degree of differentiation, the relation of it to its own stroma and to the tissues of its host, the degree and character of mitosis, detailed study of the reaction of the chromosomes in this mitosis, and the degree of degenerative change in the cell itself, are all factors which must be properly assessed in making a diagnosis. The greatest difficulty at present arises from the great increase in the number of early cases which come to the surgeon and to the pathologist, and this is responsible for the greatly increased number of border-line cases. The cell hyperplasia of chronic inflammatory change at times simulates very closely that of the true neoplastic condition. Bloodgood has shown that large numbers of breast lesions, which, years ago, were diagnosed as early malignancy, have not proved to be malignant, and this introduces the subject of the so-called "pre-cancerous" change. If cancer results from long continued chronic irritation, there must naturally be some transitional stage between benignancy and malignancy, but there is no actual proof that the "pre-cancerous" lesions become cancer. On the other hand, by the careful follow-up of many cases of pre-cancerous and border-line lesions, it would appear that the great majority remain as such for many years, and hence should not be ranked as in any degree malignant. Bloodgood's dictum that any lesion so difficult of diagnosis that good pathologists cannot agree as to its malignancy

is usually benign has much to recommend it. Malignancy, as a rule, declares itself somewhere in the lesion if a sufficiently careful search be made. If a specific stain for the malignant cell can be developed, or if histological technique can be so improved as to enable the pathologist to accurately distinguish the cancer cell from the non-malignant one, the problem of the border-line lesion will disappear.

The question of grading the malignancy of a given tumour is one of great interest and importance. Broders, of the Mayo Clinic, was one of the early workers in this field, and grading is now applied to tumours of the skin, cervix uteri, breast, and other tissues. Broadly speaking, the criterion on which these gradings are based, *viz.*, the degree of differentiation of the tumour cell, should give an indication of the probable rate of growth of the tumour. But a great many other factors must be considered. The clinical stage of the disease is important; the age of the patient is a factor; the amount of tumour tissue subjected to microscopic examination; the intangible factors of resistance and susceptibility cannot be overlooked. But, in spite of these objections, grading has a definite clinical value, if its limitations are borne in mind by pathologist and clinician, and, while errors will occur, considerable assistance to the surgeon and therapist and benefit to the patient will accrue in many cases. Warren, of Boston, reporting the results of autopsies performed in cases of cancer of the cervix which had been graded, was impressed by the value of grading in determining the degree of malignancy.

Cancer is now one of the most common fatal diseases. Approximately one-seventh of the deaths after the age of 40 years are the result of malignancy. Bashford states that in England, among those over 35 years of age, 1 man in 11, and 1 woman in 8 will die of cancer. Vital statistics are, of course, not entirely dependable, but the figures of large hospitals and clinics, where diagnosis is more thorough, would seem to support Bashford's figures. Cancer, according to various workers, notably, Maude Slye, is common as a spontaneous disease in animals. In my own laboratory I have had cases of chicken sarcoma, carcinoma of the kidney and thyroid in dogs, and numerous skin cancers in other domestic animals submitted during the last few years. Studies of

tumour-incidence among animals in zoological gardens in Philadelphia and London show the relative frequency of malignant disease there. The incidence increases with the age of animals. Mammals are more subject to the disease than birds, and tend to show it mainly in the digestive tract, while birds more commonly show it in the genito-urinary system. The disease appears to be increasing, but whether this is apparent or real cannot, perhaps, be definitely settled at the present time. The public is more "cancer-conscious" and many patients now report for diagnosis and treatment who in earlier years would have died undiagnosed. The deaths would have figured in the vital statistics of the day under some other classification. To the pathologist who handles much surgical and autopsy material there would appear to be some increase. Better diagnosis is undoubtedly a factor. Preventive medicine has in most countries materially lengthened the life expectancy. If long-continued chronic irritation, set up by various carcinogenic agents, be the most important factor in the causation of the disease, this added span of life gives this factor more scope, and an increase in cancer incidence is to be expected. In other words, preventive medicine lessens the death rate from infections, increases the number of people alive in the later decades, and will supply a more fertile field for the development of cancer. The hazards of certain

TABLE I.  
MALIGNANCIES IN SURGICAL TISSUE 1924-1933

Year	Operations	Malignancies	Per cent	Lepidomata	Hylomata	Complex Tumours
1924	1,185	76	6.5	68	7	1
1925	1,377	89	6.6	84	5	0
1926	1,455	90	6.2	84	6	0
1927	1,432	84	5.9	79	3	2
1928	1,467	130	8.8	119	8	3
1929	1,356	94	7.0	87	5	2
1930	1,476	120	8.9	110	9	1
1931	1,873	143	7.6	134	8	1
1932	1,690	128	7.9	112	14	2
1933	1,824	170	9.3	155	13	2
Total	15,135	1,124	Average 7.5	1,032	78	14

occupations, especially those where exposure to carcinogenic agents is unavoidable, is apt to increase the incidence.

I have made an analysis of all the surgical tissue passing through the laboratory of the Hamilton General Hospital for the ten-year period 1924-1933, the results of which are shown in the accompanying Tables. Tissue from 15,135 operations was examined; 1,124 specimens were diagnosed as malignant, which gives a general percentage of 7.5. In the first

four years of the period, the percentage of surgical patients showing malignancy ran just above 6. In the last six years, the percentage was 7 to 9.3. These figures may mean nothing at all, as so many factors have to be considered, but I cannot avoid the impression that we are seeing more malignancy today than we did even ten years ago. Tumours of the lining membranes provide 90 per cent of the total; tumours of the female breast form 21 per cent; of the female genitalia, 20 per cent; of the

TABLE II.  
MALIGNANCIES IN SURGICAL TISSUE 1924-1933

	Epithelioma	Carcinoma	Chorio-epithelioma	Adamantinoma	Melanoma	Sarcoma	Lymphosarcoma	Endothelioma	Complex Tumour	Carcinoid	Giant-cell Tumour	Total
1. Breast.....	3	238				1						242
2. Uterus.....	96	75	3			7						181
3. Tube.....		2										2
4. Ovary.....		23				2						25
5. Vagina.....	13		1		1							15
6. Vulva.....	9											9
7. Kidney.....		7							1			8
8. Bladder.....	34	1										35
9. Prostate.....		27										27
10. Penis.....	5											5
11. Testis.....		3							4			7
Total.....	160	376	4			11			5			556
12. Lip.....	26											26
13. Mouth.....	27											27
14. Jaw.....			1									1
15. Tonsil.....	3					1						4
16. Nose.....	11					1	1					13
17. Antrum.....		4										4
18. Palate.....								1				1
19. Pharynx.....	3											3
20. Larynx.....	8											8
21. Bronchus.....		2										2
22. Parotid.....		1						8				9
Total.....	78	7		1		2	1	9				98
23. Tongue.....	21											21
24. Oesophagus.....	9	1										10
25. Stomach.....		32										32
26. Pancreas.....		1						1				2
27. Liver.....		6										6
28. Spleen.....						1						1
29. Ileum.....		2					1					3
30. Colon.....		71										71
31. Rectum.....	1	72										73
32. Appendix.....		1									6	7
Total.....	31	186				1	2				6	226
33. Skin.....	61	15			5	4		1				86
34. Soft Parts.....		5				39						44
35. Lymph Gland..	18	30		1	1	2	1					53
36. Omentum.....		18				1						19
37. Peritoneum....		7				5						12
38. Pleura.....	1											1
39. Bone.....	1					1					1	3
40. Brain.....						1						1
41. Eye.....					1	4						5
42. Ear.....	8	1										9
43. Thyroid.....		11										11
Total.....	89	87			7	55	3	2			1	244



gastro-intestinal tract, 19 per cent; of the male genitalia, 7 per cent; and of the skin, 7 per cent. These figures would, no doubt, correspond to those of any centre of similar size.

In conclusion, may I say that in a brief communication many interesting and important phases of so broad a subject must necessarily be overlooked. The developments of the past generation have changed the aspect of the problem, and the chances of solution seem brighter than at any time in its history. Further advance in the knowledge of the pathology of the disease will depend mainly on the solution of the problem of etiology. The recent work on the isolation of efficient carcinogenic agents in pure form would seem a great step forward. Studies of the antibody production incident to the presence of cancer cells in the body, and of immunity to neoplastic growths, may not only aid in solving the etiological problem but may furnish weapons with which to fight the disease. The knowledge of the intimate physical and biochemical metabolism of the cancer cell and of its host will be extremely helpful. In the meantime, the management of the disease will continue to be based largely on microscopic diagnosis. The use of biopsy, even with its limitations, has a very important place in the correlation of the pathology of the disease with its therapeutics. The broadening interest of pathologists in a closer study of border-line lesions which simulate cancer, and which are usually not malignant, is increasing the knowledge of the histology of the disease and is of great clinical service. Grading of malignant neoplasms, that is, giving an estimate of the potential malignancy, is an advance whose full

benefit will be felt by physician and patient when all the associated factors are taken into account. There is need for further study to this end, and progress can be made only if accurate after-histories are carefully recorded. There is much reason to be gratified at the progress made since the beginning of the century, even if it has not yet resulted in much improvement in the incidence or control of the disease. There is also much ground for the hope that in the reasonably near future the problem will be solved. When the etiology, immunology, prophylaxis, and therapeutics of malignant disease are established, its control will then be only a matter of efficient public health measures.

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**TINCTURE OF IODINE IN TREATMENT OF SEPTIC ABORTION.**—F. A. Wahl states that at Marburg treatments of septic abortions (1) along conservative lines, (2) by curetting, (3) by intervention, provided hæmolytic streptococci are not found, (4) by deferring curetting till the third to the seventh apyrexial day, have all been found inferior to the method introduced by Kehrer, in which, immediately after operative emptying of the uterus, an interior application of diluted tincture of iodine is made. If an abortion is incomplete and uncomplicated by extrauterine extension, the cavum after careful dilatation of the cervix is washed out with several litres of 0.05 per cent potassium permanganate solution at 50° C., and is emptied by the finger and/or a sharp curette. After a second similar lavage two strips of

gauze dipped in a 10 per cent solution of tincture of iodine are successively placed for five minutes in the cavum uteri. Quinine and pituitary extract are also given. During the past eight years 145 cases thus treated gave a mortality of 1.4 per cent only, and showed a notable shortening of the average stay in hospital to eight days. This treatment, like other active measures, is contraindicated by complications such as parametritis, adnexal inflammation, or vulvo-vaginal ulceration. Its efficacy is ascribed in some degree to bactericidal activity of iodine, but also to stimulation by alcohol, induction of uterine contractions, and the occurrence of local immunizing reactions in the necroses which occur after the application.—*Zentralbl. f. Gynäk.*, Sept. 8, 1934, p. 2121. Abs. in *Brit. M. J.*

## THE PLACE OF SURGERY IN THE TREATMENT OF CARCINOMA OF THE ALIMENTARY TRACT\*

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THE alimentary tract is all too frequently the site of carcinoma. The disease may occur in any portion of the tract, and, while it is relatively commonly found in the stomach, large intestine, or œsophagus, it is exceedingly rarely found in the longest portion of the tract, namely, the small intestine. In 833 consecutive cases encountered in The Mayo Clinic in a period of twelve months, in which a diagnosis was made of carcinoma of the alimentary tract, the site of the lesion was that given in Table I.

TABLE I  
SITUATION OF CARCINOMAS OF THE ALIMENTARY TRACT

<i>Patients</i>	<i>Situation</i>	<i>Per cent</i>
97 .....	Esophagus .....	11.6
419 .....	Stomach .....	50.3
10 .....	Small intestine .....	1.2
91 .....	Large intestine .....	10.9
216 .....	Rectum .....	25.9
833 .....	Total .....	99.9

The segments in which carcinoma commonly is found are those which are subjected to the greatest trauma, either intrinsic or extrinsic. The common sites for the disease to establish itself, therefore, are the lower portion of the œsophagus, the lesser curvature of the stomach, the recto-sigmoid, and the rectum. The relative immunity of the small intestine to primary carcinoma is further evidence that chronic irritation, in its broadest sense, may be an important factor in determining the site of carcinoma. Concerning the small intestine, there is, too, the probably significant fact that embryologically it is the primitive gut; the stomach and colon are of later development in the evolution of the intestinal tube.

It would seem reasonable that the rules of prophylaxis which are applicable to external organs should be applied, also, to internal organs, in the hope of decreasing therein the

incidence of carcinoma. I have little doubt that the likelihood of the development of carcinoma of the alimentary tract is less among persons who exercise reasonable care in the quantity and quality of the food they eat than it is among those who have an habitual disregard for these and other rules of hygiene.

### SYMPTOMS AND DIAGNOSIS

In addition to having a common predisposing factor, carcinomas of the various portions of the alimentary tract have similarities in respect to symptoms and diagnosis. Carcinoma in any situation rarely is associated with pain (in the early stages), and in carcinoma of the alimentary tract this unfortunate fact is particularly true. The early symptoms of carcinoma in this situation are so vague that the physician may not think to employ those methods which would make possible early diagnosis. Apart from hæmorrhage or perforation, complications which rarely occur early, the first manifestation of malignancy of the alimentary tract usually is some disturbance of function. Because of the complex neuromuscular mechanism of the tract the motor function easily is disarranged, and this results in symptoms of which the patient is conscious to a greater or lesser degree.

In the diagnosis of lesions of the gastrointestinal tract certain signs and symptoms are particularly significant. For example, dysphagia is an early sign of carcinoma of the œsophagus; fullness after a moderate meal arouses suspicion as to the presence of carcinoma of the stomach; and increasing constipation suggests a malignant growth of the large intestine. These early indications, however, frequently are of slight degree, and this, in conjunction with the fact that (except in cases of carcinoma of the œsophagus) a growth may attain considerable size or extensively infiltrate surrounding tissues without disturbing motor function, explains in large part the infrequency of early recognition of the disease.

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It cannot be too often repeated that *there is no typical syndrome of early carcinoma of the alimentary tract, and that the symptoms commonly given as being associated with the disease are those of the later stages and not of the early stages.* It is of fundamental importance, therefore, to realize that *the usual first manifestation of malignancy in the alimentary tract is slight disturbance of function.*

The chief concern in the diagnosis of carcinoma of the alimentary tract is the possibility of its early recognition. The more often the disease can be detected while it is still a local process, the higher the percentage of patients cured. The relationship between early diagnosis and cure is as yet unknown, but even should some method be found to detect and to determine the site of a malignant process in its incipency, I believe that promises as to the curability of early-discovered carcinoma would be found to be excessively optimistic. I do not minimize, nevertheless, the value of informing the public of what little the medical profession knows about the disease, and even if reckless statements are made as to what could be accomplished if an early diagnosis were made, the effect may be all that can be expected in our present knowledge of carcinoma, namely, to decrease the percentage of cases in which, when first encountered by a competent physician, the condition obviously is beyond any hope of cure.

The obligation of members of the medical profession is to instruct themselves and laymen in the one fact that it is only by complete examination that a diagnosis of early carcinoma of the alimentary tract can be made. Rectal carcinoma is the only one which can be detected early by physical examination, and for this reason digital examination of the rectum never should be omitted. As Giffin has pointed out, such examination might well be done first, so that it will not be inadvertently omitted.

Complete examination should include fluoroscopic and roentgenographic studies by a competent roentgenologist. It is obvious, however, that complete examination is not practical at present as a routine, and it is this fact that demands such experience and judgment on the part of the clinician. The more extensive the clinician's experience with carcinoma of the alimentary tract, the more ready he is to attach significance to signs and symptoms which to one

of lesser experience would not appear to justify further investigation. The astute clinician under such circumstances will not be satisfied until the only examination by which early malignancy of the alimentary tract can be detected, that is, roentgenographic examination, has been made. Even more important, he will continue such observations until a diagnosis has been established or his suspicions have been allayed. What is needed, therefore, is that a simple and inexpensive method of roentgenological examination of the gastro-intestinal tract be made available, and that interpretation of findings be made by those of adequate training.

#### TREATMENT

The purpose of treatment of carcinoma of the alimentary tract, first, is cure, and, secondly, palliation.

That the disease is curable has been shown conclusively, and the only method of treatment which can deal adequately with the disease is wide removal of both the primary growth and the regional lymphatic structures. It should be pointed out that the only fair estimate of the curability of carcinoma of the gastro-intestinal tract is based on cases in which removal can be accomplished. The percentage of cases in which diagnosis can be made and resection can be done, varies from approximately none among cases of carcinoma of the œsophagus to 41 among cases of carcinoma of the rectum. In The Mayo Clinic, the rate of resectability for carcinoma in the various situations in the gastro-intestinal tract, based on cases in which operation was performed in a period of twelve months, is that given in Table II.

TABLE II  
RATE OF RESECTABILITY OF CARCINOMAS OF  
THE ALIMENTARY TRACT

<i>Situation of carcinoma</i>	<i>Patients operated on</i>	<i>Subjected to resection</i>	<i>Per cent</i>
Esophagus . . . . .	0	0	0
Stomach . . . . .	271	125	46
Small intestine . .	8	6	75
Large intestine .	168	84	50
Rectum . . . . .	152	89	58
Total . . . . .	599	304	50

Resectability depends on many factors, the most important of which is the accessibility of the lesion. It is for this reason that carcinoma of the œsophagus, although it is, theoretically, the most curable of any malignant lesion



of the alimentary tract, is the most consistently fatal, as surgical removal is practically prohibited. On the other hand, carcinoma in any other portion of the alimentary tract may be sufficiently accessible so that on that score removal may not be prohibited. It is true that lesions which involve the upper portion of the lesser curvature of the stomach seldom are resectable. This is not entirely due to inaccessibility, but rather to the difficulty of removing all of the diseased tissue, and incomplete removal of the primary carcinoma is worse than useless. In the colon and rectum removal usually is possible wherever the growth may be situated, operative procedures being suitably modified to permit satisfactory approach to the lesion.

Since the majority of lesions, except those of the œsophagus, are accessible, the chief basis for operability is the extent of the disease, the involvement of adjacent lymph nodes, and distant metastasis. In carcinoma of the stomach, the most common reason for inoperability is extra-gastric involvement, and this explains why removal is possible in only about 22 per cent of the cases encountered. Involvement of regional lymphatic structures usually is early in gastric carcinoma, and much more easily extends beyond the possibility of surgical removal than does lymphatic involvement in cases of carcinoma of the colon. Similarly, distant metastasis, for example in the pelvis or supraclavicular lymph nodes, develops much earlier in association with gastric carcinoma than with carcinoma of the colon.

The most common site for distant metastasis in cases of malignancy of the colon is the liver, and if this organ apparently is not involved it is unlikely that any other distant metastatic growths will be present. It is for this reason that the chances of removing a carcinoma of the colon are at least twice as great as are the chances of removing a carcinoma of the stomach. A further reason is the fact that a lesion of considerable size in the stomach may give rise to symptoms that are insufficient to cause the patient to go to a physician, whereas a lesion of the same type in the colon frequently is associated with most pronounced symptoms. Again, carcinoma of the stomach commonly is of the scirrhus type, but this type does not infiltrate in the same way in the colon, and partly because of this carcinoma of the

stomach can be removed much less frequently than can colloid or ulcerative lesions which are more sharply demarcated.

The indications for the treatment of carcinoma of the alimentary tract will depend also on the situation and extent of the growth, the presence or absence of metastasis, and the age and condition of the patient. In cases in which obvious metastasis is not present, operation should be advised and exploration carried out as promptly as possible, except in the presence of carcinoma of the œsophagus. Although carcinoma in this situation may theoretically be operable, the hazards involved in extirpation of the growth and reconstruction of the tract may be so great, and the prospects of a result that is really worthwhile to the patient so slight, that the operation rarely is justified. It is true that success has been reported by Thorek, Grey Turner, and others, but success is so notable as to emphasize the almost insurmountable problems confronting the surgeon in this disease.

The factors which determine the advisability of exploration for malignant or apparently malignant lesions of the stomach deserve elaboration because of their special significance and importance. The question whether metastasis is present in cases of carcinoma of the stomach is of first importance in determining whether or not surgical treatment is indicated. Fortunately, early, distant metastatic growths occur in situations in which they can be detected by careful examination, and when they are found, the problem is clarified in so far as any prospects of cure are concerned, but when they are overlooked, unnecessary exploration may be made. The most common sites of distant signs of incurability are the supraclavicular lymph nodes and the peritoneum of the rectal shelf. Nodules in either site denote incurability, but not always undesirability of exploration. When enlarged lymph nodes are palpable in the supraclavicular region, and the patient is known to have carcinoma of the stomach, the nodes must be considered metastatic until proved to be otherwise. Usually they fit into a picture already identified as that of inoperability, and the assumption that they are malignant is warranted. Occasionally, however, the primary growth is small, obstruction is present or impending, and the enlarged lymph nodes are not as typical of metastatic nodules as are those which usually are en-

countered. It is then necessary to excise, under local anæsthesia, a nodule satisfactory for microscopic examination, and treatment is then directed according to the result of this study. If the excised node is malignant, operation always is contra-indicated, even if marked obstruction is present, for the life of the patient is so near an end that non-surgical treatment of the obstruction is best. If the nodes prove to be inflammatory, and there are no other detectable metastatic growths, exploration is indicated, unless the lesion, or its local extension, or other factors make it unwise.

Careful search should be made for involvement of the peritoneum of Douglas' pouch, for this may be the site not only of early but also of the only metastatic growth. Rectal examination of patients who have carcinoma of the stomach should never be omitted. It should be made after the bowel has been cleared of faecal material, and the patient should be examined in both the lithotomy and knee-chest positions. It is because these rectal secondary growths probably are true implants that operation on the primary growth may be advisable occasionally, even when secondary rectal implants definitely are present. For example, the patient who is in good general condition, but who has an antral lesion producing obstruction, may be greatly benefited by operation, both in respect to relief of symptoms and length of life, even if the "rectal shelf" is encountered in the course of the pre-operative examination.

The more common adjacent sites of metastasis from gastric carcinoma are the liver and the umbilicus, and when metastatic growths are clinically demonstrable in these regions operation is contra-indicated, regardless of other circumstances. Extra-abdominal metastasis is relatively rare in carcinoma of the stomach, except that which affects the supraclavicular lymph nodes. In a study of all the roentgenological examinations of the lung made in the Clinic up to 1930 Kirklin and Ochsner found that pulmonary lesions, definitely secondary to carcinoma of the stomach, were extremely uncommon, and could be found in only three instances. Abdominal metastatic growths, other than the forms mentioned, are not infrequently detectable, or suspected by the demonstration of fluids or of extra-gastric masses, and such findings definitely contra-indicate any surgical

treatment. The significance of irremovable metastatic growths discovered at exploration, therefore, is incurability, but, as will be pointed out, such growths may not preclude the possibility of long-continued palliation in certain cases by removal of the primary growth.

Examination of the upper part of the abdomen frequently will disclose findings of importance in deciding as to the advisability of operation. When such information is correlated with the roentgenological report of the character of the lesion, as shown by fluoroscopy and roentgenography, the possibilities of surgical treatment become more predictable. There are frequent apparent inconsistencies, however, between physical findings and surgical possibilities. The most common fallacy is that the non-palpable growth is more likely to be found removable than the palpable one, but the reverse often is true. The large growth frequently is of the colloid type, with sharply defined margins, whereas the small lesion may extend by infiltration, and have little tendency to the formation of tumour. When the growth can be palpated, its mobility is of extreme importance in estimating the possibility of removal, and a very large tumour, freely movable, particularly laterally, apparently is more likely to be found resectable than a small tumour which is more or less fixed.

The age of the patient is important in considering the advisability of operation for gastric carcinoma. Other things being equal, the younger the patient, the clearer are the indications for exploration, and it is on relatively young patients that the most extensive operations are justified.

Pain in gastric carcinoma has significance in respect to operability. Although distress is a common symptom, severe pain is rare, and usually is the result of extra-gastric involvement from penetration or perforation of the growth. Because of this pain is an unfavourable sign, and when it is pronounced, and particularly when it extends posteriorly, the possibilities of thorough removal of the growth are very remote, even though the size and situation of the lesion apparently favour removal.

Of significance, also, is a marked sensation of fullness after the ingestion of a small quantity of food. Although fullness after eating is one of the most common of the early manifestations of gastric carcinoma, and therefore of no par-

ticular significance from the standpoint of operability, inability to take small quantities of food and drink usually is evidence that extensive involvement of the walls of the stomach already has taken place. Dysphagia suggests encroachment on the cardia and is a bad prognostic sign.

The value of laboratory investigations in carcinoma of the stomach, from both diagnostic and prognostic standpoints, is very limited. It is now well known that little dependence can be placed on the presence or absence of free hydrochloric acid in diagnosis of the disease, since in approximately 50 per cent of cases of proved carcinoma of the stomach free hydrochloric acid is present. From a prognostic standpoint it has been interesting to find that studies made by Gray of patients cured by gastric resection demonstrated that the rate of curability was definitely higher among those with achlorhydria than among those whose stomachs contained hydrochloric acid, and apparently the higher the value for acid, the less the prospect of cure.

The correlation between clinical signs and symptoms, on the one hand, and roentgenologic examination, on the other, is of the greatest importance. Fluoroscopic and roentgenographic examinations by a competent roentgenologist will give more definite information as to the characteristics of the growth than all other methods combined. Roentgenology, to be correctly employed, however, must be properly correlated with the clinical signs and symptoms.

The treatment of carcinoma of the alimentary tract depends, as already has been pointed out, on both the situation and the extent of the disease. In carcinoma of the oesophagus, since operation practically is prohibited, palliation is all that can be accomplished. The best form of palliation at present is relief of obstruction by dilatation. The former practice of performing gastrostomy in cases of obstruction of the cardia from carcinoma has been abandoned with the introduction of methods of dilatation. The prolongation of comfortable life by repeated dilatation is definite, as Vinson has pointed out.

In carcinoma in other situations in the alimentary tract, surgical exploration will disclose a certain number of cases in which the condition is inoperable, but would not be proved to be so by clinical examination.

In those cases in which circumstances are such as to justify removal of the growth there are

certain general principles on the basis of which this should be done, although there are many methods, each of which has definite indications. The first requirement is that it must be possible to remove the primary growth completely. There is nothing so ineffective and inadvisable as partial removal of the primary lesion. The operation is useless, not only from the viewpoint of cure but the operative risk is great. As Lahey has pointed out recently, a surgical death under these circumstances can never be justified. Just how distant the line of resection should be from the visible evidences of the disease varies in different situations. In the colon, the limit of the disease usually can be readily determined, but in the stomach the scirrhus type of carcinoma easily may confuse the surgeon as to its extent, particularly along the lesser curvature of the stomach, which is the direction in which the disease extends. In addition to wide removal of the primary growth, the accessible regional lymph nodes, whether or not they are enlarged, should be removed. Following removal of the growth, gastro-intestinal continuity should be restored, so that all lines of anastomosis will be secure and well-protected, and so that the reconstruction will be mechanically perfect. Finally, all these requirements should be fulfilled with the least possible risk of death or morbidity.

Carcinoma of the stomach, from the standpoint of surgical treatment, presents many problems. The disease differs from carcinoma of the rectum in that in the latter radium, apparently, occasionally has some definite use, whereas in carcinoma of the stomach there has been found as yet no practical method for its use. The only possibility for cure, therefore, is in removal of the growth, and any portion of the stomach, or the entire organ, may be removed by a surgical procedure. Recent studies have shown that although carcinoma very rarely gives any gross evidence of extension into the duodenum, microscopically, in a definite percentage of cases, carcinoma-cells can be found to have spread into the duodenal submucosa. It is wise, therefore, in removing malignant growths which have extended to the pylorus, to include a substantial section of the first portion of the duodenum. Again, the widest possible removal of the lymph nodes is necessary, and in the scirrhus type of carcinoma the line of resection should be placed



at a distance of at least 3 cm. from the apparent lesion.

The curability of carcinoma of the stomach depends to a considerable extent on the thoroughness with which the growth and regional lymphatic structures are removed. The methods of resection are many, but I believe they all should be based on the principle of the Billroth II procedure. The direct anastomosis of stomach and duodenum after resection for carcinoma may be followed by obstruction due to recurrence about the line of anastomosis, thereby defeating one of the important purposes of the operation, that is, to protect the patient against such complications as obstruction. Occasionally the growth is so situated along the upper portion of the greater curvature that the lesion can be excised without changing the gastro-intestinal continuity, that is, by direct closure of the defect following excision.

The rate of operability of carcinoma of the stomach shows that consistently, year after year, in about 45 to 50 per cent of the cases in which exploration is performed the growth can be removed. The mortality rate for combined resection of all types is approximately 10 per cent, although with routine pre-operative preparation of these patients, and careful selection of the type of operation, we had one series of more than 200 consecutive cases in which resection for gastric carcinoma was performed with a mortality rate of 5 per cent.

Graham,<sup>4</sup> in urging that "we reverse our attitude to this disease, and, instead of speaking of the mortality factor, stress the incidence of cure", has expressed the belief that the only hope of altering the mortality rate of carcinoma of the stomach is by serious investigation in each case, primarily by means of a carefully elicited history, and, secondarily, by radiographic methods competently applied. "The economic seriousness of this disease," wrote Graham, "can best be appreciated by the fact that in the United States 90,000 people die of carcinoma each year. Of this number, 34,000 die of carcinoma which originates in the stomach."

In studying the curability of carcinoma of the stomach, Gray<sup>5</sup> reported that five years after operation, 20 per cent of the patients were alive and apparently well, including those patients who were subjected to operations for palliation.

However, of patients who were operated on early enough so that the disease was still confined to the stomach, and so that the diseased tissue could be fully resected, about 50 per cent were still alive and well three years after operation.<sup>1</sup>

An important consideration in the surgical treatment of malignant lesions of the colon is the preparation of the patient so that the risk of operation will be reduced to a minimum, and the maximal possibilities of cure afforded. This preparation should include: (1) non-residue diet which will contribute as much as possible to the cleansing of the colon; and (2) the employment of intra-peritoneal vaccination. Surgeons have long been aware that definite peritoneal immunity is developed in the few days following any peritoneal irritation, and it has even been advocated that, preparatory to unusually serious operations, the abdomen should be opened and the field of operation packed with gauze some ten days before the actual operation is performed. Although this apparently is impractical, other methods of bringing about relative immunity can be carried out readily. The one which seems to be most efficient at present is the use of protein irritants and vaccines injected directly into the peritoneal cavity.

Dixon and Rixford<sup>3</sup> summarized a study of the cytological response to peritoneal irritation as follows: "The normal peritoneal fluid of man contains about 2,300 white cells per cubic millimetre. Of these about 45 per cent are histiocytes; very few are neutrophils; a few are eosinophiles and basophiles, and many are lymphocytes. Inflammation causes an increase in the total number of cells; at first there is an increase in the number of neutrophils, later, an increase in the number of histiocytes. Injection intraperitoneally of a mixed colon bacillus and streptococcus vaccine increases the total cell count 10 times or more, causing an early increase in the number of neutrophils and a later increase in the number of histiocytes. At least part of the protection against peritonitis afforded by intraperitoneal vaccination would seem to be the result of a non-specific production of phagocytosis, caused by an increase in the number of histiocytes."

Malignant diseases of the ascending, transverse, and descending colon usually can be dealt with by resection and restoration of con-

tinuity. Exceptions are those cases in which, because of the inflammatory character of the lesion or the presence of marked obstruction, or because of the age or condition of the patient, preliminary ileo-colostomy or colostomy is necessary, or, perhaps, exteriorization of the growth. In cases of malignancy of these portions of the colon, primary resection, in one stage or multiple stages, is carried out in about 50 per cent of cases in which operation is performed at The Mayo Clinic.

As the recto-sigmoid is approached, direct anastomosis after removal of the growth becomes more and more difficult, and in the rectum direct anastomosis is inadvisable, of course, because of the absence of peritoneum. The greater the difficulty of access to the growth, the more advantageous is preliminary colostomy, and, taking everything into consideration, probably the most useful operation for carcinoma of the lower part of the sigmoid and the rectum is colostomy followed by removal of the growth at a later time. It is true that this combination of procedures can be carried out at one operation, and, as performed by Miles, of London, this operation fulfils all the requirements of efficient surgical treatment of carcinoma of the lower part of the sigmoid and rectum, but great experience and judgment are required to avoid a prohibitive mortality rate. As Wilkie concluded: "Operation by stages, adequate time for recuperation between stages, and pre-operative immunization are recommended."

For carcinoma of the lower part of the rectum excision, with preservation of the sphincters, occasionally is the operation of choice, and reasonably good function may be occasionally obtained.

Radium may be indicated because of the age or condition of the patient, and there have been a number of cases in which the lesion apparently had disappeared and had shown no evidence of recurrence or metastasis in a period of ten or more years.

The risk of death from operation in cases of carcinoma of the colon, including all types of resection, according to Dixon,<sup>2</sup> is 11.8 per cent. This is based on the number of patients and not on the number of operations. A series of cases in which a certain type of operation was performed may be associated with a lower mor-

tality rate because of careful selection of patients for that particular kind of resection. In cases in which exploration is performed 50 per cent of the growths are found to be removable. These results parallel those of Wilkie, although in a series of 181 cases he reported a rate of resectability of 55 per cent.

The curability of carcinoma of the large intestine may be judged only by considering those cases in which the growth was removed. In carcinoma of the colon and rectum, considering cases in which patients survived resection five years or more, curability averages 39 per cent, according to Dixon, varying from 51 per cent in carcinoma of the cecum to 36 per cent in carcinoma of the recto-sigmoid. Wilkie<sup>6</sup> recently has reported that 40 per cent of his patients gave no evidence of recurrence five years after resection.

*Palliation.*—An important purpose of surgical treatment of carcinoma of the alimentary tract is palliation. Experience has shown that for carcinoma of the stomach the most efficient method is removal of the primary growth, since this retards the progress of the disease and usually protects the patient against those complications such as obstruction, bleeding, starvation, and perforation, which are so commonly associated with the unremoved growth. Removal may be undertaken even when distant metastatic growths are present, such as an isolated nodule in the liver or implantation on the pelvic peritoneum, to secure for the patient the advantages of an unobstructed gastro-intestinal tract.

The best method of palliation in gastric carcinoma, when it is not possible to remove the growth, is its exclusion. This can be done by utilizing the suggestion of Devine, of Australia, who proposed, in the treatment of certain types of duodenal ulcer, division of the stomach above the angle, closure of the lower segment, and restoration of gastro-intestinal continuity by gastro-jejunostomy. This operation, I believe, has more application than has been accorded it in special types of inoperable carcinoma of the stomach. I have been surprised, in a number of cases, at the length of comfortable life which followed the operation when it was well indicated.

Gastro-enterostomy as a palliative measure so frequently fails in its purpose, as Walton re-

cently has emphasized again, that it should but relatively rarely be performed for carcinoma. Statistics show that the length of life following gastro-enterostomy is little longer than if the disease is allowed to run an uninterrupted course, and all too often it fails to protect the patient against the complication for which it was performed, namely, obstruction.

#### SUMMARY

In summarizing this brief review of some observations on carcinoma of the gastro-intestinal tract, one might again emphasize that, from the diagnostic standpoint, signs and symptoms which apparently are insignificant deserve thorough investigation. Until some routine method of efficiently making use of roentgenology is found, the fate of the patient depends to a great extent on the awareness of the physician who performs the first examination that serious trouble may

be present with little or no clinical evidence of its existence. Secondly, the best prospect of cure is removal of the growth. Prompt exploration, therefore, is advisable, not only because this will make possible a chance for cure but also because it will often protect from the distress which precedes death from the primary lesion. Thirdly, operation always is justifiable if the primary growth can be removed thoroughly and there are no evidences of irremovable metastatic growths.

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### THE RÔLE OF RADIOTHERAPY IN THE PROBLEM OF MALIGNANCY\*

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"Cancer is today the most outstanding problem in medicine and public health. That its incidence threatens the ascendancy of all other causes of death, that its study engages intensive attention in all fields of medicine and surgery and does not even escape deepest consideration in fields quite remote from medicine, is now well recognized. Education of both the profession and public is the most essential part of an active campaign for the prevention and cure of cancer". (Welch).

IN the *American Journal of Cancer*, March, 1934, the editor, Francis Carter Wood, says, "The fact is that the medical profession can no longer shirk its responsibility for the education of the public in this matter of cancer. We must do it or it will be done for us." Forssell has recently said, "In the field of cancer, the development of surgical clinics was a most outstanding event in the past century; the development of centralized, adequately equipped and efficiently staffed radiotherapeutic clinics is the great contribution that the present century brings". "Only by means of intensive clinic organization can the field of radiotherapy be adequately developed". "Regaud's intensive

service in organizing centralized radiotherapeutic clinics in France during the past ten years is truly worthy of world-wide recognition and approbation."

In these very definite statements, pronouncements by men who enjoy international recognition in the field of cancer, we apprehend some of the outstanding necessities that the present cancer situation imposes. Quite obviously the problem is not merely one of diagnosis and treatment, for there are other vital considerations that urgently press for adequate solution, and in point of practical utility these are quite as important as are the two more familiar factors, diagnosis and treatment.

While irradiation therapy already occupies a proved position in relation to cancer, radiotherapists have long been impressed with the fact that here it is essential to seize every possible vantage ground that makes for more effective attack, and that no great advance is likely to be registered until this vital principle wins universal acceptance. To place radiotherapy on an entirely rational basis is the ob-

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jective that radiotherapists are constantly striving for. It is not intended at the present to express personal opinions or prejudices, but rather to present a cross section of the radiotherapeutic viewpoint. With this in view, evidence that particularly represents an international conception in the field is presented for consideration.

Throughout Canada, at the present time, abundant evidence is to be found that cancer is constantly and increasingly spreading. In 1932 (the last available Canadian statistics) it was recorded that 10,014 Canadians died of cancer. In retrospect, it is interesting to note that but a quarter of a century ago the death rates for tuberculosis and cancer were practically equal. Today we observe with no little concern that while the death rate from tuberculosis is definitely falling our cancer death rate is constantly rising. What influence have adequate organization and more efficient attack exerted in altering this picture? This question is well worthy of our consideration.

A clear conception of the incidence of cancer in the various anatomical systems is informative. In 1932 Canadian vital statistics revealed the fact that there were 5,439 deaths from malignancy in the digestive tract; in the female genital organs, 1,004; in the female breast, 962; in the male genito-urinary organs, 683; in the buccal cavity, 483; in the respiratory organs, 338; in the skin, 201; and in the female urinary organs, 152. More particularly analyzed deaths due to cancer were grouped as follows: stomach, 2,552; breast 962; uterus, 822; buccal cavity, 483; rectum, 457; prostate, 377; œsophagus, 205; and, finally, the larynx, with 160.

In an attempt to combat this most insidious menace medical science has given of its best. At the moment we are particularly concerned with the advances that radiotherapy has made. In point of years the history of radiotherapy is brief; in point of actual discovery and concrete contribution to the field the story is an extremely lengthy one. The year 1895 marks the discovery of x-rays and in 1898 radium was discovered. From 1898 to 1910 irradiation procedure was largely a therapeutic curiosity. The decade 1910 to 1920 marks a period of intensive research and one of widespread application of irradiation therapy, but largely on an empirical basis. From 1920 to 1930 we

find a crystallization of viewpoint in relation to the specific indications for radiotherapy and more effective methods of application. Intensive research and the application of advanced methods of procedure, now on a more scientific basis, mark the years 1930 to 1934. Today it is definitely recognized that the legitimate scope of radiotherapeutic attack has so widened that it embraces a very large percentage of the total cancer field.

#### THE SCOPE OF RADIOTHERAPY

In the digestive tract, irradiation is recognized as the treatment of election in cancer of the lip, mouth, tongue, pharynx and also in the anal area. In cancer of the rectum pre-operative irradiation constitutes the ideal primary attack. In many cases it is the only treatment that can be offered. In early cases combined treatment (irradiation and surgery) affords the patient the best prospect. In œsophageal malignancy irradiation is the single measure that offers the patient the greatest relief.

In the case of malignancy in the genito-urinary organs irradiation is indicated, and is constantly exhibited in almost the entire field. In cancer of the uterus, vagina, vulva, female urethra, bladder, prostate, penis, and testicles not only does irradiation constitute the primary attack but very largely it is the treatment of choice. In cancer of the breast irradiation is a dominant factor in successful treatment. The primary attack upon cancer in the nasal accessory sinuses, the tonsil, the pharynx and the larynx is radiotherapeutic. In many cases no other form of treatment is exhibited. In cancer of the lung, the bronchi or pleura, palliative irradiation is indicated. In sarcoma, the initial attack is provided for by irradiation, and this may be the sole attack. In secondary malignancy, irradiation often effects marked palliation. This is particularly outstanding in bony metastases in which situation pain is often entirely relieved. Because of late recognition a large percentage of cancer cases cannot be considered from the viewpoint of curative attack. Of those cases that have been given a curative form of procedure quite probably not more than one-third are cured. From these two groups large numbers come under the care of radiotherapy for its palliative influence.

## INFLUENTIAL FACTORS IN RADIOTHERAPY

In the field of irradiation therapy, as now recognized, many factors have combined to produce the present status. Many of these are worthy of special recognition— (1) The inspiration and direction that constantly emanates from such cancer centres as Memorial Hospital, New York, Radiumhemmet, the Radium Institutes in Paris, Brussels, and London. (2) Forssell's vigorous teaching in relation to the necessity for organized cancer clinics and his many triumphs in the field of radiotherapeutics. (3) Ewing's work in correlating pathology and therapeutics. (4) The work of Murphy in 1921 and that of Russ and Scott in 1927 to the effect that cancer transplants do not readily grow in irradiated tissue. (5) Broder's work on tumour grading and its influence on prognosis and treatment. (6) Regaud's determination that prolonged homogeneous irradiation produces an effect that is not secured by short intense irradiation. (7) Quick and Martin's work in establishing the essential erythema dosage in order to effectively sterilize various types of growth in the buccal cavity and in the neck. (8) Coutard's work on protracted fractional irradiation and particularly in its relation to cancer of the larynx and throat. (9) The work of Barringer and his associates in relation to cancer of the bladder, prostate, testes and penis. (10) The radiotherapeutic contributions by Pfahler, Keynes and Cade, particularly as they pertain to breast malignancy. Thanks to these and many other contributions it is now definitely established that in certain sites of cancer incidence not only is radiotherapy capable of destroying malignancy but also that the results secured are often permanent. A comparison of the incidence of recurrences after surgical and radiotherapeutic attack definitely assists in clarifying this view point. In Sweden, Forssell has pointed out in regard to cancer of the skin that recurrences after radiotherapeutic treatment are seen in 20 per cent of those treated. After surgery, recurrences are found in 24 per cent of the cases. In cancer of the lip (no metastases) after radiotherapy recurrence is seen in 13 per cent of the cases; after surgery there is a 27 per cent recurrence. In operable cases of cervical cancer after radiotherapy, recurrence is noted in 31 per cent; after surgery, recurrence is seen in 47 per cent.

Another contribution in regard to the efficacy of radiotherapeutic attack is worthy of special recognition. Westermarck, in an analysis of all cancer deaths due to malignancy of the breast in Sweden, has pointed out that without treatment the patient lives on an average 31 months; after surgery, 39 months; with post-operative irradiation, 49 months; with pre- and post-operative irradiation, 61 months; with endothermy and irradiation, 67 months. The deduction is obvious.

## BREAST MALIGNANCY

In further substantiation of the radiotherapeutic viewpoint a brief review of the treatment of cancer in the breast is informative. Statistics from Bloodgood, Moynihan and all Sweden have shown that the curability of cancer in this situation is approximately 20 per cent when surgery is the sole treatment. In regard to surgery and irradiation (combined treatment) Pfahler has collected statistics which show that the percentage curability is raised to 35. In Pfahler's own series it was raised to 47. Forssell has analyzed 162 cases in his service and secured 36.5 per cent of five-year end results. This is a most noteworthy accomplishment, since 88 per cent of his cases showed metastases when first coming under treatment.

All authorities have stressed the high degree of curability that is to be secured in group one—"early operable malignancy", or malignancy that is definitely limited to the breast. In this situation 70 per cent and over of five-year clinical cures are not infrequently recorded. In this picture of high percentage attainment lies a basic principle constantly applicable to the whole field of malignancy and concerning which all too little has been accomplished. This is the necessity for the institution of such organization as will serve to secure earlier diagnoses.

With radium treatment only, Geoffrey Keynes, of St. Bartholomew's, London, has secured three-year end-results amounting to 77.7 per cent in early operable cases and 54 per cent in all cases that could be classified as operable, (with surgery alone the equivalent figures are 75 and 30 per cent). In his total group of 125 cases, in spite of the fact that 38 (30 per cent) were entirely inoperable, Keynes secured a three-year salvage of 47 per cent. The significance of these findings is obvious. Keynes' conclusions in relation to this work

are interesting and he has summarized them as follows. (1) The aim of radium therapy is to carry the attack beyond the range of the surgeon's knife. (2) The results of radium treatment very favourably compare with surgical attack. (3) After successful treatment the patients are virtually normal women. (4) Radium is the treatment of choice in advanced cases. (5) For average cases radical surgery is not necessary. (6) In early cases radical procedures are unnecessary, as quite excellent results can be obtained by radium alone.

While radiotherapeutic accomplishment in breast cancer is a matter of definite record and also one of particular pride with radiotherapists the method has by no means won universal acceptance, and objection to its exhibition is still strenuously urged in certain circles. Only profound misconception can account for this attitude, since the objective that radiotherapy constantly seeks is simply that of a higher percentage curability, with increasing certainty and with less mutilation to the patient. How best to accurately portray radiotherapy's true objectives and its practical accomplishment is often a problem most difficult to solve. Cade, of London, has said, "A sermon to the converted is unnecessary, but no amount of pleading can influence those who are blind to the potential possibilities that inherently characterizes adequate radiotherapeutics".

That the principle of irradiation in breast malignancy will shortly be generally accepted and applied no radiotherapist doubts. As evidencing this, a recent editorial in *Radiology* (November, 1933) by Soiland, of Los Angeles, is most applicable. In this article he states, "The one agent that has positively demonstrated beyond peradventure its ability to destroy cancer is radium. On the basis of accumulated experience I now feel justified in recommending irradiation therapy in every breast tumour in which there is a reasonable certainty of primary carcinoma. Surgery, *per se*, has decisively failed, in that it has made no appreciable progress in changing the clinical cure period over that which obtained before modern irradiation therapy came to the front. If surgery can cure breast cancer, it is equally curable by radium, but the results in either case depend upon the ability of the clinician who is responsible for the treatment". Too often, in both radiotherapy and in surgery, we ignore

this latter basic fact, and in consequence our viewpoints become distorted.

#### UTERINE MALIGNANCY

One of the earliest fields in which radiotherapy established recognition was that of cancer of the uterus. While its supremacy here now stands unquestioned, it is of practical moment to recall that all the deprecatory arguments that have characterized the bitter controversy that once obtained in this particular field are still occasionally heard in many of the other fields of cancer incidence that radiotherapy is increasingly attacking. In regard to cancer of the uterine cervix, the Minister of Health in Great Britain in 1927 analyzed 6,661 cases that had been treated surgically. The absolute percentage cure in this group was 18.3. Similarly, Heyman, of Stockholm, in 1927 analyzed 5,024 cases that had been treated in 24 surgical clinics. His finding was an absolute percentage cure of 18. From 1914 to 1923, Forssell treated by means of radium 790 cases and reported an absolute percentage cure of 20.1. Similarly, Healey, of the Memorial Hospital, in 1934 reported 1,574 cases, with an absolute percentage cure of 21. In 1933 Regaud, of the Radium Institute in Paris, announced that he had succeeded in raising the total salvage in cancer of the cervix to 35 per cent. In the definitely operable group of cervical malignancy surgery has secured a 35 per cent salvage. In a similar group, Forssell has reported a radiotherapeutic salvage of 40.4 per cent and Healey 55 per cent.

With an immediate mortality of at least 17 per cent, surgery has secured a total salvage that is not only less than that which is secured by radiotherapy, but, further, under radiotherapeutic procedure there is practically no immediate mortality. Also, and of great practical moment, surgery offers little to that very large group of inoperable cases (possibly 75 per cent of the total) that are so familiar to all of us. In addition to the minimal risk that radiotherapy confers, not only are a great many inoperable cases cured but also the necessity for lengthy hospitalization is largely eliminated. Further, hopeless cases are frequently returned to a state of comparative normality for prolonged periods. The advantages of irradiation in this particular site are perfectly



obvious and have won almost universal acceptance.

In cancer of the uterine body, Heyman has reported upon 318 cases from 8 surgical clinics. In the operable group there was a 58.8 per cent salvage. Considering all cases, the salvage was 42.8 per cent. From 1913 to 1921 Forssell treated 46 cases with a salvage of 60 per cent in the operable group, and in all groups, 43.5 per cent. Healey, in 1934, reported a 75 per cent salvage in his total group. Lindsay's contribution in relation to prognosis and treatment, as visualized in the histological picture, has been no small factor in this picture of progress. The record of therapeutic accomplishment that the unbiased investigator finds in the field of breast and uterine malignancy is testimony that serves to place irradiation therapy upon a plane that is quite above reproach, and marks a phase of very definite triumph in our endeavour to conquer cancer.

#### MORE RECENT ADVANCES IN THE FIELD OF RADIOTHERAPY

The curability of cancer in many sites of incidence, under favourable conditions, is often a revelation to those who are not familiar with the progress that has been registered in more recent years in the field of radiotherapeutics. Recent work on cancer of the prostate, testicle and bladder is well worthy of recognition, for example. It is well recognized that cancer in these sites almost invariably entails a hopeless prognosis, so that any advance is noteworthy. In reviewing 154 cases of teratoma testis treated by means of irradiation at Memorial Hospital, Ferguson shows a 29.5 per cent five-year salvage. It is worthy of note that 115 of these cases were entirely inoperable. Since this salvage is very far in excess of any results that have been obtained by other means, the accomplishment is most outstanding. Ferguson's more recent work in this field is even more promising. Out of 54 cases treated since October, 1930, he reports that over 50 per cent are alive and well.

In a very recent communication Barringer has reported upon 78 cases of cancer in the bladder, controlled entirely by irradiation. Of these, 33 were operable, 43 inoperable, and 2 were borderline. In 205 private cases he has secured three-year results in 56 cases, or 27 per cent, and five-year results in 39, or 19 per cent.

In 1931, Barringer strongly emphasized the point that the possibilities of surgery in cancer of the prostate had already been fully exploited. In substantiation, reference was made to the findings of Bumpus and Young. Bumpus had found a life-extension of only a few months after surgery. In Young's analysis of 500 cases only 7 per cent were considered operable; of this number only 8 survived three or more years. In 1931 Barringer reported 8 out of 40 cases (20 per cent) as alive and well over five years. In 1932 Ferguson, Barringer's associate, introduced an improved technique in relation to the application of interstitial irradiation in the prostatic area. With this modification of procedure, much better end-results are confidently to be expected.

As relating to metastases in the neck, secondary to buccal cavity, labial, or pharyngeal malignancy, Quick, in a recent summary, emphasizes the efficacy of irradiation procedure and the comparative lack of indication for block dissections. This is a most outstanding contribution. Healey's recent contribution in relation to malignancy of the corpus uteri is most heartening. With no operative mortality, he has secured over a 75 per cent salvage in 134 cases. In this picture radiotherapy has played a most prominent part.

#### AVERAGE AND POTENTIAL PERCENTAGE CURABILITY OF CANCER

Percentage figures of average and potential accomplishment have apparently contributed very much to the misunderstanding that perennially surrounds the subject of curability in cancer. While average accomplishment produces but a 20 per cent salvage in the case of cancer in the breast, and also practically the same in the uterus, with early recognition practically four times this accomplishment is possible. Recalling that 2,000 Canadian women die every year because of these two conditions, it is obvious that we must lend every possible effort to the end of securing the case while strictly early. In cancer of the skin and lip we should secure practically 100 per cent salvage. With early diagnosis this is definitely possible. In malignancy of the buccal cavity, if effectively treated while still very early, radiotherapeutic treatment should manifest practically a 75 per cent curability. In the case of cancer in the stomach, Balfour has secured

128 ten-year cures, or favourable results in 20 per cent of the cases where the stomach was resectable. Rankin, in resectable cases, has secured a 33 per cent five-year salvage in cancer of the rectum. With earlier diagnoses the percentage rate would be much higher.

With these figures to guide us there can be no question about our attitude. Not only must we ever stress the importance of early diagnosis, but we must constantly lend of our best in an attempt to secure this attainment. The more we concern ourselves with potential accomplishment in the field of cancer, the more difficult it becomes to escape the conclusion that if we could uniformly secure early diagnoses there would be no question about the relatively higher percentage salvage that would at once obtain.

#### WHY LATE DIAGNOSES?

In part explanation of the high percentage of late cancer diagnoses, the reasons recorded are worthy of consideration. In a recent analysis of 200 late diagnoses made in a state clinic in Saskatchewan, it was found that ignorance (48.3 per cent), fear (11.13 per cent), misdirection (10.13 per cent), absence of pain (7.07 per cent), procrastination (6.05 per cent), and financial impediment (9.44 per cent) accounted for the delay in the cases studied. Obviously these are unfavourable factors that not only could be, but must be, eliminated if definite progress is to be registered in the control of cancer.

#### FUNDAMENTAL FACTORS IN EFFICIENT TREATMENT

In regard to treatment it must ever be kept in mind that prevention and early diagnosis are our most dependable offensive weapons, and until this is fully recognized and provided for potential accomplishment will continue to be thwarted. In prevention, early recognition, adequate surgery and efficient radiotherapy we find the basic fourfold therapeutic conception. To effectively implement this conception is a responsibility that the present cancer situation places directly upon the medical profession.

In successful radiotherapeutic attack there are certain fundamental factors that not only demand recognition but must also be most scrupulously observed. Neglecting this, we fail

to provide the patient with that measure of protection which accumulated experience has taught is essential to success. The development of greater efficiency in the control of cancer is our task. In assuming this responsibility, and there can be no question about the profession's ultimate decision in this matter, it is helpful to contemplate the considered viewpoint of one of the world's most distinguished workers in the radiotherapeutic field.

In May, 1930, Forssell most effectively summed up the conditions that are essential to efficient radiotherapy. In regard to the fundamental factors that enter into successful radiotherapy he has stated as follows.

1. It is a universal experience that the capacity of radiotherapy is constantly doubted wherever organization has not provided all essential treatment facilities, accumulated skill and intensive experience.
2. A radiotherapeutic centre should be located in a large hospital, in order to take fullest advantage of every possible scientific facility and experience.
3. Only in an organized clinic is it possible to improve and develop the field and to secure a necessary concentration of material.
4. The fullest possible measure of cooperation with the department of surgery is essential.
5. An urgent necessity is constant control and supervision of the work, and a specially trained and controlled staff of aides is most necessary.
6. In combined attack (surgery and irradiation therapy) it is essential to establish the fact that the main procedure, important as it may be, is not the surgical attack. This is but a helpful auxiliary, and the patient must constantly be kept under radiotherapeutic supervision.
7. Radiotherapists must be prepared to devote life and soul to radiotherapy. Not only must the radiotherapist have ample time for the work in hand, but, recalling that treatment procedures are constantly in a state of transition, there must also be ample time for study and research.

#### THE FUTURE OF RADIOTHERAPY

In relation to the future of radiotherapy, a further quotation from Forssell is of practical importance.

1. It is to be recalled that while radiotherapy is important, by itself it will never cure a single case of cancer. Behind it there must constantly be efficient organization, the fullest possible measure of treatment facilities, accumulated skill and experience.
2. Money now being spent upon radiotherapeutic facilities will be wasted unless adequately controlled. Only in organized clinics is there prospect for advance.
3. There is a great danger to the patient in inefficient radiotherapy. With limited resources the risk is great. The benefit of the patient must ever be paramount, and only the best can be approved.
4. Improvement in methods and technique is only possible in centralized and thoroughly organized clinics. A *sine qua non* for improvement and development is organized research in the field of radiotherapy in cancer and within the sphere of cancer biology.
5. While radiotherapy is capable of great accomplishment in the field of cancer, it is to be remembered that the attack is local, and therefore, this method can

never become a panacea. Only in localized malignancy is there a reasonable prospect of success. Tumours in such localizations, or those which present such infiltration that complete surgical removal is not possible, provide a very large field for the development of combined surgical-radiotherapeutic attack.

6. Future progress, in no small measure, depends upon the early recognition of cancer while still at the primary site, certainly not beyond the primary glandular area. The case must be seen at the earliest stage and not as an ultimate refuge after unsuccessful surgery. In such situation, border-line cases, our task is to reduce the size of the tumour, to provide better limitations, and to so weaken the vitality of the tumour that re-implantations will be prevented at the time of operation. After surgery it is the task of radiotherapy to complete the sterilization of the glandular area.

In these very definite statements, firmly established because of a most intensive experience that has taught their necessity, is to be found the type of direction that the Canadian medical profession must actively assimilate and practically apply, if it is to establish consistent progress in the direction of conquering cancer. Not only is this the direction that emanates from one of the oldest and one of the most efficient cancer clinics in the world, but in addition these are, in the main, the teachings that all well-organized cancer centres have long continued to stress as obligatory. The recommendations of the Cancer Commission of the League of Nations in relation to this most important consideration are well worthy of detailed study.

#### ANTI-CANCER ORGANIZATION

In the *American Journal of Cancer* for April, 1934, the editor, Francis Carter Wood, has stated, "The Swedish cancer organization is so thorough that it commands the admiration of the entire world". Most opportunely, he then publishes a complete story of the existing organization in Sweden, written by Forssell himself. It is a fortunate coincidence that this detailed plan should appear at this time, and thus relieve us of all necessity for an interminable inquiry as to what constitutes adequate organization and how best it can be provided. Worthy of special note is the fact that in many ways we are years behind the march of progress in the matter of providing adequate direction in relation to cancer. Many European countries have quite out-distanced us in this most important undertaking, and have given a type of direction the practical importance of which cannot well

be overestimated. As a profession we shall never be afforded a greater opportunity for rendering a distinctive type of humanitarian service than by faithfully copying the plan that has been so comprehensibly, so painstakingly, and so laboriously drafted for our guidance.

In conclusion, let us revisualize the dismal picture that the existing cancer situation portrays in this country. Every year we witness an increasingly ghastly catastrophe in the sacrifice of more than ten thousand lives, due to cancer. Over thirty thousand Canadians are annually afflicted by this, one of the most destructive of all plagues. Seventy-five per cent of these victims will finally come to us quite too late for the institution of a curative therapeutic procedure. Stricken by cancer, the hapless victim, blinded by ignorance, and misled by the insidious nature of his affliction, aimlessly wanders and all too frequently entirely misses the pathway that offers greatest hope. In his pitiful plight, largely because of fear, misdirection, false security, procrastination or financial impediment, he loses direction and falls a prey to an untimely death, a victim of cancer. Only in the institution of the fullest measure of public and professional education and in the creation of adequate cancer clinics is there to be found an improved outlook for the victim of cancer. Triumph over cancer, already too long retarded, will never be adequately registered until these basic necessities are provided. Our greatest hope is to be found in an adequately educated rising generation. This is a vantage ground that cannot fail to provide us with a most valuable offensive weapon. Is it not our responsibility to assist in every possible way in providing a vigorous national cancer organization of a type that constantly and ever increasingly will carry mortal combat into the citadel that cancer now dominates? In our present light, irradiation therapy is destined to play an increasingly important rôle in the field of cancer conquest, and radiotherapists are prepared to lend every possible assistance, to the end that cancer shall be destroyed.

An extensive list of references has been prepared by the author and can be obtained on application.





## ACUTE APPENDICITIS

(A REVIEW OF 614 CASES WITH SPECIAL REFERENCE TO DRAINAGE)

By E. HOWARD CAYFORD,

*Montreal*

THIS analysis of the cases of acute appendicitis admitted to the wards of the Montreal General Hospital in the three years 1931, 1932, and 1933, includes only those in which acute inflammation was definitely confirmed by the pathologist. In all there were 614 cases, with 21 deaths, showing a death rate of 3.42 per cent, which compares favourably with series elsewhere. The average stay in hospital was 15.99 days. Only 210 of the cases were admitted within the first 24 hours of the disease. Owing to the relatively few patients under 12 years of age, the disease in reference to children was not considered.

Group A of the series includes all those of acute diffuse or acute suppurative appendicitis, in which little or no inflammatory process extended to the surrounding tissues. The one death which occurred in this series, was of a female, aged 28 years, who suffered from general debility associated with long-standing kidney disease. She died on the 13th day after operation, with acute gangrenous cystitis and uræmia.

Group B includes a total of 265 cases in which spreading or diffuse peritonitis was present. In each case free fluid or free pus was found at operation: in each there was a pathological report of acute suppurative, acute gangrenous, or acute perforative appendicitis. In this group drainage was employed in 111 cases, and the abdomen was closed without drainage in 154; in many of the latter the incision wound was treated with liquid paraffin or with "bipp". The difference in morbidity and mortality between these two sub-groups is somewhat impressive, and the average hospital stay in the undrained cases was very much less.

Group C includes patients suffering from acute appendicitis with localized abscess. It will be noted that 21, or 28 per cent of the total, were closed without drainage. In these cases, the abscess cavity usually was evacuated by suction and moist gauze, and the abdomen closed with the application of liquid paraffin or "bipp" to the wound. There were no deaths in the non-drainage group, and there were comparatively few complications.

In addition to these main groups, there were 8 patients with acute appendicitis, who averaged 6 days' illness prior to admission. These were extremely sick, with marked abdominal distension; and in 2 of the cases cyanosis was a feature. Of these 8 patients 6 were operated on by simply draining, leaving the appendix *in situ*, two of whom died, one on the first day after operation, the other on the seventh day. Both were ill three or four days previous to operation. Of the two remaining patients, one, with a history of duodenal ulcer, was operated on for definite perforation of the ulcer, the appendix being overlooked. He died 8 hours later, and post-mortem examination demonstrated a concurrent perforated appendix. The other case was treated expectantly, with a fatal issue.

In summing up this analysis, the points that strike one as important are that the average hospital residence per patient, 15.99 days, compares favourably with other series; that the death rate is comparatively low; and that in cases where a drain could be omitted safely there was a marked decrease in the number of hospital days.

Regarding the question of drainage, there is the same diversity of opinion in the Montreal General Hospital as exists in the literature on the subject. There is a group of surgeons, using a very specialized technique of drainage for the moderately severe to the extreme case, as described by Dr. Fraser B. Gurd, and which, briefly, consists of applications of "bipp" to the incision wound before opening the peritoneum, and the use of soft packing gauze, 2 to 4 inches in width, soaked in liquid paraffin, to which a small amount of "bipp" is applied on the surface.\* These gauze packs are placed through the wound in an amount dependent upon the gravity of the case. In the extreme case, obliteration of all infected areas in the pelvis, about the cæcum, and behind the ascending colon is the aim, whereas, if the soiling is only at the site of the stump of the appendix, one

\* Bismuth, iodoform, paraffin paste contains: bismuth subnitrate, 1 part; powdered iodoform, 2 parts; liquid paraffin, 1 part.

single pack is inserted down to the bed from which the infected organ has been removed.<sup>1</sup>

Many of our surgeons use "bipp" for the incision wound edges, but as many more oppose its use, preferring to substitute liquid paraffin if a protective for the abdominal wall tissues seems indicated. The soft rubber cigarette drain is used frequently, sometimes placed into the pelvis, or used retrocæcally, or both; sometimes only to the bed of the appendix, or into the abscess cavity. In a few cases, a rubber dam has served as a drain, and it is also used as a subcutaneous drain in the thick, fatty abdominal wall, where infection is feared.

The main controversy, however, is not how to drain, but whether or not drainage is necessary, and, if it is necessary, when. The trend at the present time is to drain less frequently, and some surgeons question the ability of the ordinary drainage measures to actually drain or to evacuate pus from the peritoneal cavity. They also feel that the drain may lead the infected material to clean areas, thus, unnecessarily causing secondary, residual abscess, or perhaps traumatizing the bowel, with resultant faecal fistulae or obstruction.

D. P. D. Wilkie<sup>2</sup> advises immediate examination of the peritoneal fluid. If it shows a lack of mononuclear cells, their failing power for absorbing stains, and the absence of phagocytosis, it is sufficient evidence that drainage is required. Brockman,<sup>3</sup> commenting on Wilkie's work, claims that such features are of the utmost importance in prognosis, but that if the three characteristics of the peritoneal exudate mentioned by Wilkie are present, the patient will die, whether we drain or not. Most surgeons

contend that if an abscess or localized area of infective material be present, a drain must be left in the wound, and this many men consider the only logical place for a drain. In this analysis 28 per cent of our cases of localized abscess were closed without drainage, and there were no deaths and no untoward complications.

I have no original offering on the subject, but I believe each case is a separate problem, and that there can be no standardization of procedure. The surgeon sees the case in the ward, and what meets the eye is perhaps more important than the laboratory findings. The patient who presents the picture of toxæmia, with the usual Hippocratic facies, the cyanosis, the rapid, thready pulse, will be expected to have a peritoneum that is dark, hæmorrhagic and œdematous, and hence unable to carry on further absorption and elimination, and, therefore, evacuation of the existing exudate is required, with subsequent adequate drainage. On the other hand, if the patient is bearing the disease well, it may be necessary only to remove the focus of infection, with, perhaps, the suction of free fluid or pus from the abdominal cavity, and to allow the peritoneum, assisted by Fowler's position, to do the rest. A great deal of œdematous, necrotic material at the base of the appendix calls for a drain; and the abscess cavity, which, when evacuated, leaves raw, hæmorrhagic surfaces, flakes of coagulated lymph, and œdema of the walls about the ileo-cæcal junction, would seem to require a drain.

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#### SUMMARY

##### ACUTE APPENDICITIS - MONTREAL GENERAL HOSPITAL 1931 - 1932 - 1933

Number of cases .....	614
Average days' duration of illness prior to operation ....	2.1
Average days in hospital .....	15.99
Mortality (21 deaths) .....	3.42 per cent

#### GROUP A

##### ACUTE APPENDICITIS WITH NO EXTENSION TO PERITONEUM. NO DRAINAGE. 266 CASES

Number of cases	Day of illness	Average days in hospital	Complications	Deaths
138	1	10.96	0	0
106	2	11.81	1 wound infection	1
17	3	14.24	1 wound infection	0
2	4	9.0	0	0
3	5	25.66	0	0
266		11.34		1

The one death which occurred in this series was in a female, aged 28 years, who had suffered from general debility associated with long-standing kidney disease. She died on the 13th day after operation with acute gangrenous cystitis and uræmia.

## GROUP B

## ACUTE APPENDICITIS WITH SPREADING OR DIFFUSE PERITONITIS

## 265 CASES

111 cases with drainage ..... mortality, 9.01 per cent

154 cases without drainage ..... mortality, 3.24 per cent

## WITH DRAINAGE

<i>Number of cases</i>	<i>Day of illness</i>	<i>Average days in hospital</i>	<i>Complications</i>	<i>Deaths</i>
22	1	17.82	2 wound infections	0
55	2	20.53	2 residual abscess	4
19	3	21.81	1 faecal fistula	1
6	4	24.83	1 faecal fistula	1
9	5 or more	25.89	3 wound infections	4
111		21.42		10—9.01%

The 10 deaths are detailed as follows:—

<i>Age of patient</i>	<i>Day of disease at operation</i>	<i>Day of death post-operative</i>	<i>Cause of death</i>
36	4th	2nd	general peritonitis; cardiac failure.
41	3rd	3rd	general peritonitis; pneumonia.
16	8th	1st	general peritonitis.
68	2nd	1st	localized peritonitis; pneumonia.
37	2nd	10th	general peritonitis.
25	2nd	5th	peritonitis; infarction of transverse colon; broncho-pneumonia.
19	7th	7th	general peritonitis.
2½	2nd	5th	general peritonitis.
51	?	3rd	general peritonitis.
38	?	1st	general peritonitis.

## WITHOUT DRAINAGE

<i>Number of cases</i>	<i>Day of illness</i>	<i>Average days in hospital</i>	<i>Complications</i>	<i>Deaths</i>
69	1	14.90	5 wound infections	1
63	2	13.22	2 residual abscess and	
			3 wound infections	3
14	3	10.89	2 wound infections	0
4	4	16.25	0	0
4	5	21.50	2 wound infections	1
154		13.41		5—3.24%

The 5 deaths are detailed as follows:—

<i>Age of patient</i>	<i>Day of disease at operation</i>	<i>Day of death post-operative</i>	<i>Cause of death</i>
32	3rd	10th	general peritonitis; paralytic ileus.
26	3rd	5th	general peritonitis.
21	3rd	5th	general peritonitis.
30	1st	12th	cellulitis extending from incision wound.
18	5th	8th	general peritonitis.



GROUP C  
ACUTE APPENDICITIS WITH LOCALIZED ABSCESS  
75 CASES

54 cases with drainage ..... mortality, 1.85 per cent  
21 cases without drainage .....mortality, 0

WITH DRAINAGE

Number of cases	Day of illness	Average days in hospital	Complications	Deaths
11	1	22.27	1 wound infection	0
13	2	23.39	1 wound infection	0
10	3	20.0	1 secondary abscess	1
9	4	26.33	1 wound infection	0
11	5	29.18	2 wound infections and 1 secondary abscess	0
54		24.33		1—1.85%

The one death which occurred in this series was of a man, aged 37 years, who died on the 6th day after operation with paralytic ileus complicated by broncho-pneumonia.

WITHOUT DRAINAGE

8	1	15.50	0	0
7	2	19.57	2 wound infections	0
3	3	20.66	0	0
3	4	19.33	0	0
0	5			
21		22.90		0

GROUP D  
ACUTE APPENDICITIS IN PATIENTS OVER 50 YEARS OF AGE  
58 CASES

58 cases (included in above tables) ..... mortality, 8.5 per cent

Number of cases	Day of disease on admission	Day of disease at operation	Average days in hospital	Complications	Deaths
58	2.25	2.58	20.38	2 faecal fistulae 5 wound infections	5

The 5 deaths are detailed as follows:—

Age of patient	Day of disease at operation	Day of death post-operative	Cause of death
63	3rd	1st	peritonitis; paralytic ileus.
59	several	no operation	peritonitis.
51	several	6th	peritonitis; appendix left <i>in situ</i> .
68	2nd	2nd	broncho-pneumonia complicated by diabetes.
51	?	3rd	peritonitis complicated by nephritis.

The average age in this group was 57.4 years. Eight patients were described as fat or obese; 4 were referred to the Department of Metabolism, of whom 2 showed hyperglycæmia, and 2 showed glycosuria. There were no deaths in these obese subjects.

One jejunostomy was performed with recovery.

DEATH LIST

Number of cases .....	21
Days of illness prior to admission .....	16 averaged 3.5 days 5 "several days"
Time of death .....	5 on day of operation 15 averaged 6.7 days after operation 1 no operation
Drainage .....	13 with drain 7 without drain 1 no operation

There were 15 cases with generalized peritonitis, 5 of which were complicated by pneumonia or broncho-pneumonia, and 4 of which were complicated by paralytic ileus. One patient died with gangrenous cystitis and uræmia, as described above.

Four patients on admission were moribund, with cyanosis and rapid thready pulse. Of these, 3 were operated on immediately and died in the first 24 hours; the other was treated expectantly, and died after 3 days.

Lastly, there was one death as a result of cellulitis involving the whole abdominal wall, spreading from the operation incision.

## FRACTURE, DISLOCATION, AND FRACTURE-DISLOCATION OF THE SPINE\*

BY KENNETH G. MCKENZIE,

*Toronto*

IN the treatment of fractures and dislocations it has long been recognized that restoration of the normal anatomical structure is of primary importance. This principle, however, in cases of injuries to the spinal column has only been applied in recent years, and the reason for this neglect may be attributed largely to excessive fear of causing injury to the cord by attempts at manipulation. Within the past few years it has been realized that this apprehension is groundless, because it has been found that extensive deformities can be corrected without injuring the sub-dural structures. Further, when the cord or cauda equina has been damaged by the initial injury the above-mentioned procedure may result in striking improvement or complete cure.

Numerous valuable papers have been written dealing with various phases of the subject, and in this presentation I have drawn freely from these sources of information. The only original contribution to the subject is a description of skeletal traction which I have utilized in the treatment of certain cervical injuries. This method of treatment was suggested to me by Doctor Janes at a time when we were each having trouble with a patient in maintaining satisfactory extension by the halter method. Our experience with this first case, and more recently with two others, has convinced us that skeletal traction is a satisfactory method of maintaining a prolonged forcible pull on the cervical spine.

## DIAGNOSIS IN GENERAL

Usually the diagnosis of fractured or dislocated vertebræ presents little real difficulty. Most patients are seen shortly after an accident, and, if not unconscious, will complain of pain and tenderness in the region of the injured vertebræ. Examination may disclose such definite findings as deformity of the spine, muscle rigidity, limitation of movement,

localized swelling, hæmorrhage in the tissues, paralysis of the extremities, and retention of urine. Even when there are only local tenderness and pain and the history of a comparatively trivial accident, x-ray examination of the suspected area is essential, as numerous authors have called attention to the large number of undiagnosed cases, the result of failure to suspect the possibility of fracture or dislocation. Failure to recognize and correctly treat a fracture may result in a serious disability which is difficult or impossible to overcome. - A slight fracture, if untreated, may progress to a definite painful kyphosis, a condition first described by Kümmel. Potts' disease must be differentiated from Kümmel's disease, and here, apart from evidence of tuberculosis elsewhere, the x-ray is of great diagnostic aid. In tuberculosis there is disappearance of the intervertebral space and bone involvement of the two adjacent vertebræ. In Kümmel's disease the deformity is produced by the collapse of the body, and the intervertebral space remains normal. A history suggestive of fracture may be obtained from many patients who turn out to have had an osteoarthritis aggravated by injury. Crushing fractures and anterior displacements are best seen, and often can only be recognized by lateral films. The odontoid process and the articulation between the axis and atlas are best seen in antero-posterior films made through the open mouth. Local fractures of the articular facets and transverse processes and laminae are best seen in antero-posterior stereoscopic plates. Injury to the cervical spine should always be kept in mind when dealing with a patient suffering from a cranio-cerebral injury. The relative liability of the different sections of the spine to injury is shown in Fig. 1.<sup>1</sup>

## TREATMENT

Treatment will be considered under the following four headings: (1) first aid; (2) care of

\* Read before the Canadian Medical Association in Calgary, June 21, 1934.

the bladder and rectum, and the prevention of bed-sores in the paralyzed patient; (3) reduction of the fracture, dislocation, or fracture-dislocation, and the maintenance of reduction until healing has taken place; (4) open reduction.

*First-aid.*—First-aid stations should be taught the importance of transporting or lifting a patient in such a way that displacement of the vertebræ will not take place and cause further injury by compression of the cord. This is best accomplished by lifting the patient face downwards so that any sagging there may be between the points of support will hyper-extend and not hyper-flex the spine. When the neck is injured excessive movement of the cervical spine in any direction must be prevented.

If the patient is paralyzed, with retention of urine, immediate steps must be taken to prevent the development of bed-sores and cystitis.

*The care of the bladder and rectum and the prevention of bed-sores in the paralyzed patient.*—This important phase of treatment is more easily understood when one has knowledge of the following two clinical stages described by Riddoch.<sup>2</sup> In the first stage the paralyzed muscles are toneless and flabby; superficial and tendon reflexes are absent. The muscles of the wall of the bladder and rectum are toneless and incapable of contraction, but the respective internal sphincters are in a state of tone; hence there is retention of urine and fæces, rather than dribbling and complete incontinence. The sympathetic reflexes are also paralyzed, so the skin is dry and readily becomes gangrenous. The second stage of reflex activity commences to develop in from two to four weeks. These reflexes are primitive and capable of functioning independently of the higher centres. In a complete transverse lesion of the cord they are four in number: (1) a flexor or withdrawal response of the whole leg, characteristically seen in the normal person when the sole of the foot is painfully stimulated; (2) restoration of contraction waves in the bladder and rectal musculature, associated with relaxation of their respective internal sphincters; (3) development of the coitus reflex with the ejaculation of semen; (4) return of sympathetic reflexes, as characterized by sweating.

A recent study by Denny-Brown and G. Robertson,<sup>3</sup> shows that an automatic action of

the bladder may develop even when the sacral reflex arc is destroyed by damage to the cauda equina or the sacral segments of the spinal cord. This can only be explained on the basis of a local reflex mechanism in the bladder itself. A patient under my observation at the present time has an efficient "automatic" bladder, although there is a complete destruction of all of the sacral nerves by a tumour. A severe and prolonged cystitis may destroy this local reflex mechanism and cause complete incontinence with dribbling.

When retention of urine occurs as the result of a neurological lesion, the bladder should be regularly emptied every six or eight hours by unclamping an inlying catheter or by catheterization, to prevent over-distension. Some surgeons allow the bladder to distend and overflow, in the hope that cystitis will be prevented. This is a fallacious idea, as a severe cystitis may develop in the damaged mucous membrane of a distended bladder, even though a catheter is never used. Further, I know of two cases treated in this way in which the bladder ruptured. Over-distension also mitigates against the development of an automatic bladder. When early partial or complete recovery from the neurological lesion is anticipated the bladder should be emptied by catheter regularly every eight hours. If recovery from the neurological lesion is not anticipated, prolonged catheterization is a tedious process, and has little if any advantage over an inlying catheter, which can be unclamped every eight hours so that automatic micturition may develop. Gradually over a period of months automatic micturition becomes efficient, but until it is well established it is necessary to guard against cystitis by a daily lavage of the bladder with boracic acid solution if the urine is alkaline, or 1 in 2,000 potassium permanganate solution if the urine is acid.

When an inlying catheter is not tolerated because of the frequent development of epididymitis or ulceration of the meatus, supra-public drainage is necessary, the catheter is kept clamped and the bladder allowed to empty every six or eight hours, so that automatic micturition has an opportunity to develop.

The prevention of bed-sores offers the greatest difficulty during the first few weeks, as the skin easily breaks down, because the sympathetic reflexes are abolished. The cervi-



cal cases offer the least difficulty, as the patient can easily be turned sufficiently to care for the skin without interfering with the treatment of the local lesion. Thoracic and lumbar cases offer greater difficulty. Hypertension on a Whitman frame will satisfactorily reduce the deformity and at the same time permit efficient care of the skin and bowels. It is not necessary to turn the patient completely; a slight shift of position every two hours, day and night, with frequent alcohol rubs will keep the skin in good condition. It is important to institute this régime within a few hours of the accident, as one frequently sees the develop-

ment of a bed-sore because of neglect during the first night in hospital.

Evacuation of the rectum is promoted by a daily enema, as impacted faeces may cause sloughing of the rectum. Efficient automatic emptying of the rectum develops after some months, and is aided by giving a sufficient quantity of mineral oil to keep the stool soft.

*Reduction of the fracture, dislocation, or fracture-dislocation and the maintenance of the reduction until healing has taken place.*—This phase of treatment varies with the situation of the lesion, and will be considered under the following headings: (1) unilateral dislocation of the cervical vertebræ; (2) bilateral dislocations and fracture-dislocations in the cervical region; (3) upper thoracic cases; (4) lower thoracic and lumbar cases.

*Unilateral dislocation of the cervical vertebræ.*—In 1907 Corner<sup>4</sup> drew attention to rotary dislocation of the atlas. In 1927 Jackson<sup>5</sup> reviewed the subject and collected 27 cases. He pointed out that the condition is often undiagnosed, because it may be produced by accidental violence of such a minor nature that the attending physician fails to conceive of the possibility of its presence. The joint surfaces between the atlas and axis are practically on a plane, and permit rotary movements of the head. If a sudden but slight force is applied when the head is rotated and the muscles off guard, there is a rupture of the capsular ligament and a slipping forward of the articular facet of the atlas on to or over the anterior marginal lip of the facet of the axis. A characteristic, painful deformity results. The head is rotated to one side and any attempt at movement causes marked pain at the site of the lesion. A satisfactory antero-posterior view, which normally shows the articulation in question, is difficult and often impossible to obtain because the patient cannot open his mouth.

Unilateral dislocations without fracture at lower levels occur with less frequency because of the overlapping of the articular facets. In simple unilateral dislocation without fracture there is no cord injury.

Immediate reduction by traction and manipulation carried out with the definite movements shown in Fig. 2,<sup>6</sup> is a highly satisfactory form of treatment. The use of a strap about the operator's waist, attached to a halter on the

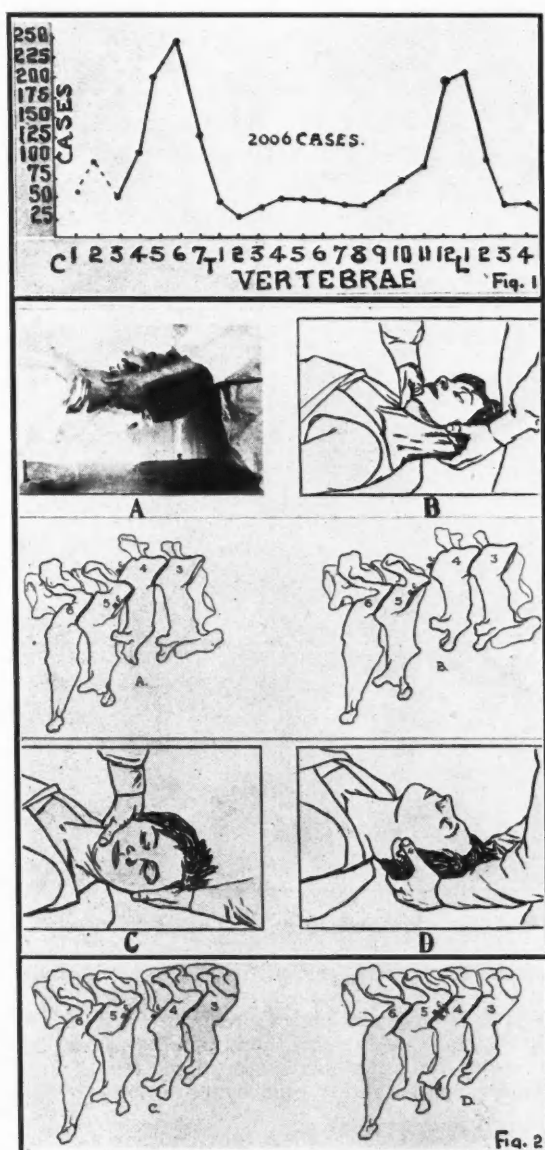


FIG. 1.—Graph of the localization of spinal injury from 2,006 cases in the literature. Note the "critical points". (Reproduced with permission of the author, Geoffrey Jefferson.)

FIG. 2.—Reduction of a left-sided dislocation of the cervical region. Modified from Langworthy.<sup>6</sup>

patient, greatly facilitates traction during the manipulation. An anæsthetic is not always necessary, but is usually advisable, because the muscle relaxation enables the operator to manipulate the vertebræ into place with greater ease and accuracy. After reduction has been accomplished a Thomas plaster collar is applied (Fig. 3). Recurrences have been reported with the collar, but it is worth a trial, as it is so

much more comfortable than a Minerva jacket, which must be very expertly applied to be efficient. In private patients a leather collar can be substituted for the plaster. The supporting apparatus should be worn for at least two months.

*Bilateral dislocation and fracture-dislocations in the cervical region.*—These cases represent the most serious group of spinal injuries be-

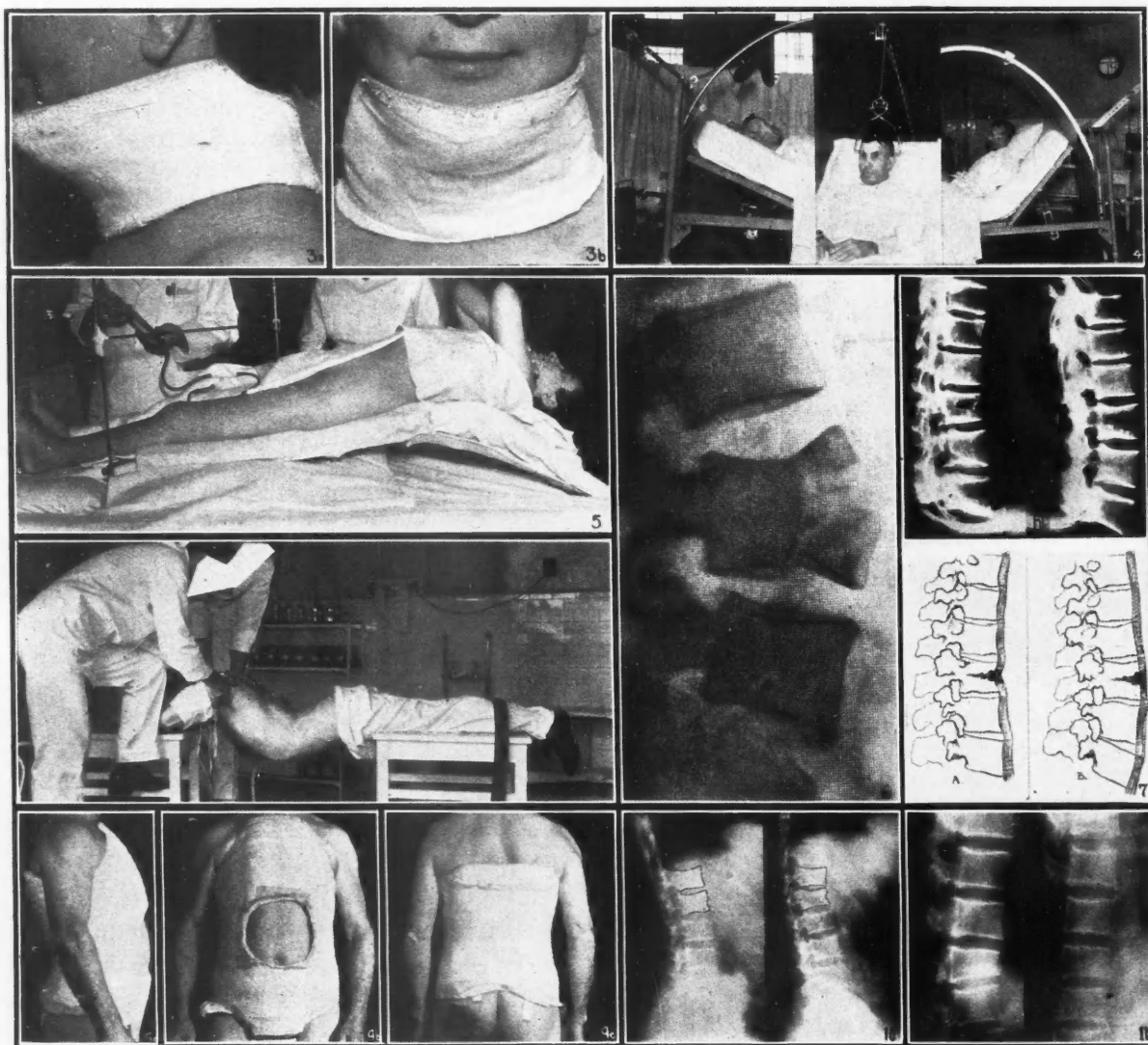


FIG. 3 (a and b).—Illustrates the use of a Thomas plaster collar after reduction has been accomplished; this is the same patient shown in Fig. 5.

FIG. 4.—Illustrating the method of applying skeletal traction on a patient with fracture-dislocation involving the 4th and 5th cervical vertebræ.

FIG. 5.—Illustrates a satisfactory method of obtaining hyper-extension in high thoracic injuries, by the use of a Whitman frame. This particular patient was paralyzed; three weeks after the injury it was possible to demonstrate waves of contraction in the bladder by the use of the apparatus shown in the photograph.

FIG. 6.—An unusual type of fracture produced by hyper-extension rather than hyper-flexion. Reproduced from Watson Jones' paper.<sup>8</sup>

FIG. 7.—Illustrates the way in which an ordinary crush fracture is reduced by a taut anterior common ligament. This is brought about by extreme hyper-extension.

FIG. 8.—Two house-surgeons supporting shoulders, the patient between.

FIG. 9 (a, b and c).—Illustrates the type of cast which is applied after reduction of crush fracture of the first lumbar vertebra. The patient was allowed to walk six hours after the cast was applied.

FIG. 10.—Shows the x-rays of the patient in Fig. 9, before and after the application of the cast; the compressed vertebra has been restored to its normal thickness.

FIG. 11.—X-rays showing the almost perfect restoration of the vertebral body in a case treated by Doctor Gallie after the manner described in the text.

cause of the high incidence of severe spinal cord damage.

Immediate reduction by traction and manipulation is considered the method of choice by some writers, notably Alfred Taylor.<sup>7</sup> Immediately following reduction Taylor applies a plaster enclosing the head and upper part of the chest, to maintain extension of the neck. This is satisfactory if the patient is not paralyzed, but if there is marked paralysis, and respiration is only being carried on by the diaphragm the patient will not tolerate such fixation; further, if the lesion is above the sixth segment, death will terminate the case within a few days at the most. If manipulation is carried out on the paralyzed patient it should be followed by traction rather than a cast.

Skeletal traction is a very satisfactory method of treating these severe cervical injuries. Fig. 4 illustrates a method of carrying out this treatment. Ice-tongs are applied by tapping the points through the outer cortex of the skull just above the lobes of the ears; this procedure causes the patient very little discomfort when the scalp is anesthetized with 1 per cent novocaine. A movable pulley at the head of the bed over which the traction cord passes gives the patient additional comfort as the head of the bed can then be raised to any desired angle. It has been our experience that there is very little reaction about the points of the caliper. This was especially noticeable in one case where a weight of ten to twenty pounds was applied over a period of almost two months. With the ordinary halter traction a patient will not tolerate a continuous pull of more than five or six pounds, whereas by this method at least twenty pounds can be used. The caliper in use now has been made somewhat heavier than the ordinary instrument supplied by instrument houses; the points are very sharp, and have a shoulder one-eighth of an inch from the tip, to prevent them being driven in too far; there is also a locking device to prevent change of position after the caliper is applied.

By the judicious use of pads placed under the head or neck it is possible to change the direction of the pull, or additional manual manipulation can be applied at any time. After reduction is accomplished the weight is reduced to four pounds, or, if considered advisable, a Thomas

collar or Minerva may be applied with the patient sitting up and the traction still in force.

If paralysis is present, extension is maintained for at least eight weeks, during which time the patient is quite comfortable and can be easily turned sufficiently to permit the proper care of the skin.\*

*Upper thoracic cases.*—Fracture dislocations in the upper thoracic region are relatively rare.

Extension and reduction can be satisfactorily obtained by the use of a Whitman frame (Fig. 5). The frame may be made more comfortable and efficient by filling in the sagging canvas between the two side bars with pads of felt. This is especially necessary in high thoracic injuries where it is difficult to get an acute enough angle to gain efficient extension. If immediate extreme extension is not tolerated the desired position may be obtained over a period of hours by removing the pads above and below the apex of the curve in the frame.

When the x-ray shows a correction of the deformity and there is no paralysis a cast is applied in the manner about to be described in the treatment of lower thoracic and lumbar injuries, and the patient may be allowed to walk. Doctor Lewis has suggested that the cast in these cases be made more efficient by separating the upper posterior part from the back by a thick pad. When the plaster is dry this pad can be removed and the shoulders held back with straps. The cast is worn four months, or replaced by some other form of efficient retention apparatus.

When the patient is paralyzed it must be admitted that a return of useful function is exceptional. However, correction of the deformity as outlined above gives the patient a better chance than any other form of treatment. Great care must be taken to prevent bed-sores by shifting the patient's position slightly every two hours, day and night; at the same time the skin over the back is thoroughly rubbed with alcohol and powdered. If these nursing duties are faithfully carried out it is not necessary to devise any scheme for turning the patient on

\* Just recently my attention has been drawn to an article by Crutchfield, published in *The Southern Surgeon*, June, 1933, describing skeletal traction on a patient with a severe cervical fracture dislocation. The deformity was not completely reduced in his case, but the final clinical result was highly satisfactory. He was greatly impressed with the comfort afforded the patient during treatment.



his face. A hole cut in the canvas permits the use of a bed-pan, but the buttocks must be prevented from sagging through this opening when the pan is not in use; this is accomplished by packing pillows in between the bed and the opening or by covering it with a separate piece of canvas which can be tightly laced in position.

*Lower thoracic and lumbar cases.*—In this situation the essential deformity is a crush of one or more bodies, produced by forcible hyper-flexion. It is unusual to find a gross displacement of the vertebræ, although this may occur. Very rarely a fracture of a body is produced by the opposite mechanism, namely, forcible hyper-extension (Fig. 6). It is important to recognize such a condition, which involves a rupture of the anterior common ligament and so must be treated by the application of a cast in slight flexion, rather than in extreme extension.

Reduction depends upon the integrity of the anterior common ligament. Fig. 7 shows the manner in which the fractured vertebra is moulded into position by the anterior common ligament when it is made taut by extreme hyper-extension. Jones<sup>8</sup> has recently published a paper showing that this extreme hyper-extension can be efficiently obtained by allowing the patient to sag between two tables; a plaster jacket is applied immediately and by the time it is dry the patient has sagged into a position of extreme hyper-extension and the cast maintains this position; an anæsthetic is not necessary. The patient is allowed up within a few hours, and the following day he is carefully instructed with regard to exercises which will strengthen the back muscles. The cast is removed in four and one-half months, and no further retention apparatus is necessary. During the period that the patient is wearing the cast he is able to carry on with any form of work which does not necessitate a mobile spine. Within six months from the time of the injury any form of occupation can be resumed. During the period that the patient is wearing the cast the importance of seeing that he carries out exercises to strengthen the back muscles cannot be over-emphasized. If this is not done and the patient not re-assured from time to time a painful weak back will be the likely result. Whereas if the patient is made to carry out vigorous exercises

before the cast is removed his morale is completely restored. Fig. 8 shows a simple, and satisfactory method of obtaining hyper-extension. The two assistants, as shown in the picture, support the shoulders and reassure the patient. An anæsthetic is not necessary. The patient suffers a moderate amount of discomfort, but avoids the danger of pneumonia, suffers less distension of the bowels, and is able to get up a few hours after the cast is applied. The cast is applied over stockinette or well-fitted pieces of silence cloth held in position with adhesive; it must fit very snugly about the iliac crest, at the site of fracture, and over the pubes and upper end of the sternum, to maintain the hyper-extended position. Fig. 9 shows a patient wearing a cast; at the same time he is able to carry on with his occupation as a gardener. Fig. 10 shows the x-rays before and after treatment. The deformity was not great in this case, but the x-rays are interesting as the case represents a type of injury which may be overlooked unless careful x-ray examination is made. If such a patient were not efficiently treated he might later develop collapse of the vertebra, a condition known as Kummel's disease, and have a permanent disability from a painful weak back. Fig. 11 shows the x-rays of a patient recently treated by Doctor Gallie. They illustrate the reduction of a more marked deformity. This patient, six months after his injury, is quite free from disability. A few years ago such highly satisfactory results were unknown, whereas today they are to be expected; undoubtedly the ambulatory method introduced by Jones,<sup>9</sup> represents a great advance in the treatment of most fractures in the lower thoracic lumbar region. Paralysis is not nearly so frequent in this group of cases. Fortunately when it does occur the prognosis is much more favourable than in the high thoracic and cervical injuries. If the lumbar and sacral segments of the cord are crushed the paralysis will be permanent. However, the most common site of fracture is just below the lumbar segment, in which case the paralysis of the legs is largely due to injury of the cauda equina, and these nerves are seldom severed, so that rapid return of function is the rule when pressure is removed by correction of the deformity. Even if the sacral segments of the cord are hopelessly damaged an efficient automatic bladder usually

develops, especially if the paralysis of the legs improves sufficiently to permit this patient to walk and so improve his general health,

Jones<sup>8</sup> advocates treating these paralyzed patients by immediate hyper-extension and the application of a plaster jacket. An alternative and satisfactory method is to first obtain reduction of the deformity by the use of a Whitman frame, as outlined in the treatment of high thoracic injuries. The skin of the paralyzed patient is more easily cared for on a Whitman frame than in a plaster jacket. If the paralysis improves sufficiently a plaster jacket can then be applied and the patient allowed up. If recovery is not sufficient to permit this the patient is kept on the frame for three or four months and then allowed up in a wheel chair.

*Open reduction.*—There is a small group of cases suitable for operation.

The only acute cases operated upon are those in whom a direct blow has driven a fragment of bone into the spinal canal. Two such cases have recently been seen. One patient fell, hitting his back on the sharp edge of a curb, and the other had the long handle of an automobile door driven into his back. In both of these patients a fragment of lamina was causing direct pressure on the cauda equina, and very satisfactory results were obtained from operation. It was obvious in these two cases that no form of manipulation would relieve the pressure. Coleman<sup>10</sup> has advocated the use of the Queckenstedt test as a guide for or against laminectomy. In the two cases outlined above the test was positive, showing that pressure on the nervous structures was still present.

When paralysis is complete and occurs immediately after the accident in cervical and thoracic injuries, it is almost certain that the cord has been hopelessly damaged. Non-operative reduction of the deformity gives the patient some slight hope of at least partial recovery. Unless there is evidence of recovery within forty-eight hours the prognosis is hopeless, and it is quite certain that operation is useless at any stage. The prognosis in lower thoracic and lumbar cases is much more hopeful, but here again hyper-extension offers the patient a much better chance than any opera-

tive treatment, apart from the occasional unusual case as outlined above.

Cystic arachnoiditis is a well recognized condition which occasionally follows trauma to the sub-dural structures. In this lesion cystic collections of fluid cause pressure on the spinal cord and give rise to symptoms some months after the injury. If the pathological condition is fairly well localized very satisfactory results follow operation.

#### SUMMARY

1. Cervical injuries are treated by a combination of manipulation and skeletal traction until the deformity has been reduced. Skeletal traction is often the method of choice.
2. High thoracic fractures are treated by hyper-extension on a Whitman frame. If the patient is not paralyzed the Whitman frame can be replaced by a cast after reduction is accomplished.
3. Patients with low thoracic and lumbar crush fractures are allowed to walk a few hours after the application of a plaster cast which holds the spine in an extreme hyper-extended position at the site of injury. If paralyzed, these patients are treated on a Whitman frame in a hyper-extended position. If the paralysis recovers treatment may be ambulatory, after the application of a cast to maintain hyper-extension.
4. The care of the skin, bladder and rectum in the paralyzed patient has been outlined.
5. The few indications for open operation have been discussed.

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## NICKEL DERMATITIS: A REPORT OF ELEVEN CASES

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THE purpose of this paper is to summarize the results of the clinical study of 11 cases of nickel dermatitis. The pertinent features of these cases will be presented briefly and discussed in the light of our present knowledge of specific sensitization to nickel.

The literature concerning nickel dermatitis has been recently reviewed by Stewart<sup>1</sup> and Goldman.<sup>2</sup> Two general types of nickel dermatitis have been recognized. The first, seen mostly in industrial workers, follows prolonged and extensive exposure of the skin to solutions of nickel.<sup>3</sup> Goldman's two cases fall into this group. The second may be considered an idiosyncrasy, and occurs chiefly in allergic individuals who develop multiple sensitivities on only occasional contacts with certain irritating substances. The case reported by Stewart falls into this group.

In a series of experiments on guinea pigs, Stewart and Cormia<sup>4</sup> attempted to determine the nature of these reactions to nickel. Specific sensitivity could not be produced, although a variety of methods were used. The experiments indicated that the dermatitis produced in guinea pigs was entirely an irritative phenomenon. The following cases, however, present certain aspects which indicate that the dermatitis, as it exists clinically in man, is not entirely irritative. This point will be considered in the discussion of the cases.

A criterion for sensitivity by the patch test method had to be developed. No uniform method for patch testing with nickel had been determined.<sup>5</sup> Conflicting results have been obtained, depending on the salts of nickel used, and whether patch tests were applied to pre-

viously involved or uninvolved areas of skin. It was necessary to determine the type of test substance to be used and its concentration. Stewart<sup>1</sup> had previously shown that nickel nitrate was too irritating to be used for patch testing. He used nickel chloride, a salt less soluble than the nitrate, but more soluble than the sulphate which has been mostly used by the German and Swiss investigators. Five, 8, 10 and 20 per cent solutions of nickel chloride were applied percutaneously for twenty-four hours to 4 normal and 6 allergic persons. Weakly positive reactions frequently occurred with 10 per cent solutions. No reactions were obtained with 8 per cent nickel chloride. The patch testing in the cases to be reported was done with 8 per cent nickel chloride, except in controlled instances.

## CASE 1

M.D., a woman aged thirty-two, who had had hay fever for seven years and vasomotor rhinitis for many years. There was a history of hay fever in the father and urticaria in one sister.

A dermatitis occurred on the arm and shoulders wherever safety pins and white gold came in contact with the skin.

Skin tests showed strong reactions to grasses, ragweed, feathers, hair and dust. Patch tests with nickel chloride were strongly positive. There was also a strongly positive reaction to cobalt chloride. Skin tests with zinc, copper, tin, aluminum, lead, iron, silver and gold were negative.

When the strongly positive reaction to the patch test with nickel occurred, there was a strong focal "flare-up" of a previous nickel lesion at a distant site.

## CASE 2

V.B., a woman aged twenty-one, who had had occasional attacks of urticaria. There was no other form of allergy, and no family history of allergy.

Strongly positive reactions were obtained to feathers, hair and dust by the scratch method.

White gold glasses had been worn for three years. For one month there had been a subacute pruritic erythematous-vesicular dermatitis at contact points on the nose and behind the right ear (Figs. 1 and 2). For two weeks a similar lesion had been present beneath a white gold wrist band. All of these lesions disappeared when the metal contact was removed.

Patch tests with nickel chloride and cobalt chloride were strongly positive at a distant site. Patch tests to other heavy metals were negative.

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## CASE 3

S.G., a man aged thirty-two, who had had occasional outbreaks of urticaria and vasomotor rhinitis. No family history of allergy could be obtained. Skin tests to various allergens were negative. For the past two years, in warm weather, an itching, vesicular dermatitis developed beneath a metal wrist band. The lesion disappeared when the band was removed, but returned when reapplied.

Patch tests with nickel chloride and cobalt chloride at distant sites were strongly positive (Fig. 3).

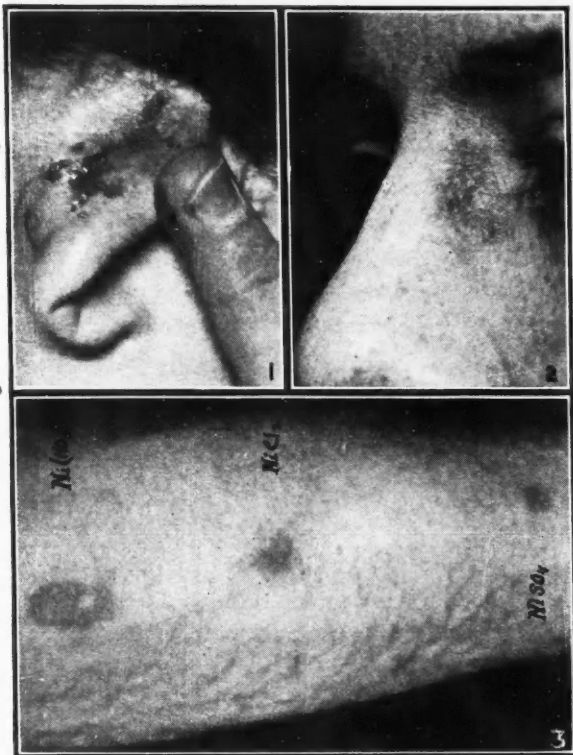


FIG. 1.—Chronic eczematoid dermatitis caused by nickel in frames of white gold spectacles.

FIG. 2.—Chronic eczematoid dermatitis caused by nickel in nose rest of white gold spectacles.

FIG. 3.—Positive patch tests with nickel salts (24 hours) showing relation of intensity of reaction to solubility of the salts.

## CASE 4

B.B., a man aged twenty-two, who had no allergic phenomena, and whose family history was negative for allergy.

At intervals for the past three years, whenever he wore a certain metal wrist band, a pruritic, vesicular dermatitis would appear at the site of contact with the skin. The lesion disappeared when the band was removed.

All patch tests with heavy metals at remote sites were negative. A patch test with nickel chloride was positive at the site of the previous lesion, but a similar test was negative at a distant site.

## CASE 5

H.S., a man, aged thirty-six years, developed occasional urticarial attacks after sea-food. There was no allergy in the family. He had had a mild seborrheic dermatitis for the past ten years.

Three years ago, after wearing white gold spectacles for two months, a dermatitis developed behind both ears and over the temples. The eruption was first erythematous and vesicular, later becoming subacute, with slight oozing, lichenification, and fissuring. There was only a very mild seborrhea of the scalp. He perspired freely.

The glasses were changed to the pince-nez type after the eruption had been present for ten weeks, but the dermatitis persisted for another six weeks before completely involuting.

Patch tests with nickel chloride on the forearm were positive. Negative results were obtained with other heavy metals.

## CASE 6

L.D., a man aged twenty-five, who had had a long standing allergic dermatitis on face, neck and upper extremities. An allergic "work-up" revealed many questionable sensitivities, and strongly positive reactions (scratch method) to house dust, chicken and duck feathers, silk, wheat, and pyrethrum. One aunt had had a drug urticaria, but there was no other allergy in the family.

Four months before consultation he began to wear white gold glasses, and one month later the dermatitis around the eyes and ears, which had always been very mild, grew much worse. Patch tests with nickel chloride were only questionably positive. Gold-rimmed glasses were then substituted, with marked improvement. Later, however, because of economic reasons, the white gold glasses were returned, and when last seen the dermatitis had reappeared.

## CASE 7

L.F., a woman aged thirty-five, who had had a vasomotor rhinitis for many years, and many attacks of bronchitis. One aunt had severe asthma; a sister was subject to urticaria.

For the past four summers she had developed a subacute erythematous and lichenified dermatitis in the area covered by a large nickel-plated wrist watch. She wore the watch during the entire year, but it was only during the summer months that the eruption appeared. She perspired very freely. The dermatitis disappeared promptly when the nickel contact was removed.

Patch tests with nickel chloride were done on the previously involved site and at a distant site on the forearm. Both were negative.

## CASE 8

M.S., a man aged twenty-two, who had had an eczema on the face in childhood. The mother gets urticaria, the father eczema, and an aunt has asthma.

Three years ago he began to wear a new nickel watch band. Eleven months ago (August, 1933) he developed an acute erythematous-vesicular dermatitis in the area covered by the band. The dermatitis wholly disappeared ten days after the removal of the contact.

Patch tests done with 10 per cent nickel chloride were strongly positive at the previously involved site, but were negative at distant sites.

## CASE 9

E. S., a nurse aged twenty-three, who had had infantile eczema on the face, and at the age of twenty-one had developed an allergic (?) dermatitis on the forearms. An aunt is subject to asthma.

For the past four years she had had an intermittent, subacute, lichenified dermatitis on the ball of the right thumb. This appeared on three occasions, whenever she was on operating room service and frequently handled nicked instruments. The dermatitis again recurred when on service in a baby ward. Questioning elicited the fact that she constantly handled nicked safety pins with the fingers of the right hand. The dermatitis subsided as soon as the contact was removed. Patch tests were done with 10 per cent nickel chloride. A negative result was obtained on the forearm, but a strongly positive reaction occurred on the previously involved area on the right thumb.

## CASE 10

M.S., a man aged forty-eight, who had had recurring attacks of dermatophytosis of the feet and dermatophytids of the forearms for the past eight years. The

dermatophytid has usually appeared during pyogenic bouts or during periods of nervous exhaustion. The family history was negative for allergy.

Five years before seeking advice he began to wear white gold spectacles. Soon after a dermatitis appeared at every point of contact with the rims and bows of the glasses. The dermatitis was always worse in hot weather when he perspired freely. He had changed glasses five times, and pearl catches had eliminated the eruption on the nose. Four weeks ago the dermatitis reappeared behind the ears, coincident with a dermatophytic explosion. It improved as the ringworm infection subsided.

Patch tests were not done, as it was feared that a generalized dermatophytic explosion might be precipitated.

The eruption behind the ears promptly subsided on removal of the nickel contact. A patch test two weeks later, performed by applying the glasses to the flexor surface of the forearm, was strongly positive.

#### CASE 11

C.B., a woman, aged sixty-five, whose general health had always been good. There was no history of allergy in the family. For the past five summers the patient had developed an erythematous-squamous, and slightly oozing, dermatitis on the extensor surface of the right forearm, at points of contact with the top of a nickel-plated ice cream cabinet. At the same time the skin in contact with her white gold spectacles would become very pruritic, and soon an acute dermatitis would appear. When the eruption became well marked extension to the non-contact areas of the arm would often occur. The patient was in the habit of resting her forearm on the cabinet top for long periods of time. This occurred throughout the year, but it was only in the summer, when she perspired freely, that the dermatitis characteristically appeared.

Patch tests with nickel chloride were strongly positive both at the involved and at a distant site. The dermatitis promptly subsided when the offending contacts were removed.

#### SUMMARY AND DISCUSSION

In 6 of the 11 cases reported there was definite evidence of allergy. In 5 of the 11 cases a family history of allergy was obtained. In each of these allergic cases the reactions were more easily produced and were more intense than in the non-allergic cases. Goldman's cases and Stewart's previous case showed similar evidence of allergy.

The Prausnitz-Krústner phenomenon was negative in the four cases in which it was attempted. This suggests that the sensitization to nickel was of the direct cellular type.

In 3 cases patch tests were negative at distant sites, but positive at the sites of previous nickel dermatitis. Most of the cases reported by Jadassohn and Schaaf<sup>6</sup> would fall into this category. This type of reaction suggests that the sensitivity in these cases was strictly a local phenomenon.

In 1 patient, acute "flare-ups" of a chronic

allergic eczema precipitated an acute dermatitis at the sites of quiescent nickel lesions. This suggests that the reactivity of the skin to irritating substances had been definitely increased.

In case 1, in which the "focal" reaction occurred following the application of the test solution, it seems likely that a highly developed sensitivity was present.

In case 6 it seems likely that the nickel was only a superimposed irritating factor. There was no sensitivity to nickel in this patient.

In case 10, in which the nickel dermatitis flared up coincidentally with a dermatophytic explosion, it is suggested that the generalized fungus infection so increased the sensitivity of the skin that the previously subthreshold irritation of the nickel in the glasses rims was then sufficient to cause a clinically active lesion.

#### CONCLUSIONS

1. Nickel dermatitis can be produced in many persons by prolonged contact with nickel. This reaction is influenced by temperature, humidity, and concentration of nickel. It is typically an irritative dermatitis.

2. There are certain persons in whom nickel dermatitis develops, where the contact is no greater than that which occurs in unaffected persons. The high percentage of allergic phenomena in the group presented suggests that the dermatitis is due to an increased tendency of the skin to react to certain cutaneous irritants.

3. Generalized hypersensitivity to nickel is present in a small percentage of people. In another small group localized hypersensitivity to nickel occurs.

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## THE "PATCH TEST" AS AN AID IN DIAGNOSIS\*

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THE "patch test", otherwise known as the contact eczema test, was proposed by Jadassohn, in 1895 as an aid in the diagnosis of skin eruptions. It has proved of definite value in establishing the etiological factor in many otherwise obscure skin diseases. The test is easily performed and needs no elaborate paraphernalia. Since its introduction by Jadassohn and further elucidation by Bloch<sup>1</sup> in 1929, the patch test has been widely used by dermatologists. However, it is felt that it has not been used by the general practitioner as extensively as its ease in performance would warrant.

The technique, as suggested by Bloch, is as follows. A small quantity of the suspected substance is applied to the skin; this is covered with a piece of linen or cotton; this, in turn, is covered by thin sheet rubber and the whole is fastened on with adhesive tape. It is allowed to stay on for twenty-four hours, then removed, and the test read.

Numerous modifications of this technique have been proposed. Shelmire<sup>2</sup> has recently suggested that, instead of fastening the linen and rubber on with adhesive tape, one should rim a round piece of closely woven linen or cotton with a liquid glue and apply this to the skin. As adhesive tape frequently causes an eruption which may interfere with the reading of the test this modification would appear to be an excellent one. However, in my hands, it has proved to be useless, as the patches will not stick properly if the test substance is moistened. Percival<sup>3</sup> has demonstrated conclusively that the test substance should be moistened with distilled water or saline. That is, one may get false negative results if the substance is absolutely dry.

The following procedure has proved fairly reliable. White tape, one and one-half inches wide, obtainable in any dry-goods store, is procured. This is cut into one and one-half inch squares, and the corners rounded. Rubber dam is then cut to the same size and fastened to

the tape with a very small quantity of glue. If the test substance is a powder or in dry particles, such as fur, sawdust, etc., it is best applied to the skin on a small piece of absorbent cotton moistened with water. Then over this is placed the tape covered with rubber dam and the whole is tightly fastened on with adhesive tape. A space of at least one-half inch should be left between the patches, so that only about eight patches can be applied conveniently to the flexor surface of the forearm. Any non-hairy portion of skin may be used for the test, but Bloch and Sulzberger and Wise<sup>4</sup> have emphasized the fact that the areas which have been in contact with the antigen are more likely to give a positive result than areas remote from the affected site; that is, if the eruption is on the neck and face, due to contact with a dyed fur collar, then a patch test with fur near the neck is more likely to be positive than one on the leg. Percival and Ingram<sup>5</sup> have not found this to be the case, and both they and Shelmire use the back for testing. Sulzberger and Wise report a positive patch test on the back in a patient who had an eruption on the eyelids from "eye drops". Thus, a general sensitivity of the skin may result from the application of an antigen to a very small area.

The test should be read in a good light, preferably daylight. There are many degrees of reaction, varying from simple erythema to the formation of large vesicles. Bloch stipulated that in order for a test to be regarded as positive it must show more than simple erythema. There must be some thickening of the skin and vesicle formation. The vesicles may be very small, and so must be seen in a good light in order to be recognized. It was pointed out by Bloch, and has since been stressed by Percival and Ingram and others, that the spot should be examined again at the end of forty-eight hours. Ingram has reported reactions appearing several days up to three weeks after the test substance has been removed. Many skins will show a marked

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erythema at the site where the adhesive tape was applied, but, with care, this need not confuse the reading of the test.

It would defeat the very purpose of the patch test if it were applied indiscriminately to every case of skin disease. The first requisite for success in the use of the test is the taking of a careful history. If one is able to elicit the information that the eruption appears after contact with a definite substance, such as face lotion, fur, primula, etc., the testing is a relatively simple matter, as only the suspected substance and a control need be used. In some cases, however, there may be as many as ten or twenty substances under suspicion; tests with all must be performed. The test substances should be of such a nature or be made of such a dilution that they will not cause a reaction on normal skin. Sulzberger and Wise emphasize this point, and remark that the investigator should control carefully all test materials before arriving at conclusions. They mention the fact that soap will cause a reaction on many skins if kept in contact for twenty-four hours. In order to test an abnormal sensitivity to soap one should use it in such a dilution that it will cause no reaction on normal skin. It is unnecessary, and indeed unwise, to have a large series of test substances with which every patient is tested. As has been pointed out before, a careful history will limit the substances under suspicion. These then should be tested for and suitable controls used. Each case must be tested on its own merits and the tests performed accordingly. Bloch and Steiner-Wourlisch<sup>6</sup> have emphasized the fact that one cannot distinguish dermatitis venenata from eczema clinically. They were able to produce widespread eruptions lasting for weeks, and clinically indistinguishable from so-called idiopathic eczema, by repeated applications of extract of *Primula obconica* to normal skins. Bloch and his co-workers became so sensitive to Primula by these repeated applications that a widespread eruption would result from the Primula plant being brought into a room with them. The practical application of this observation lies in the fact that one should not dismiss external irritants as the offenders because one is dealing with what appears to be a widespread eczema.

A positive reaction, with negative controls, to a test substance indicates epidermal sensitivity.

Fixed-cell antibodies have been formed in the epidermal cells due, possibly, to repeated previous contact. Antibodies in the blood stream are uncommon in cases where the skin alone is involved. In urticaria and angio-neurotic oedema, the antibodies are thought to be in the cells forming the blood vessel walls, and so there will likely be no reaction to a substance applied to the unbroken skin. In cases such as this the antigen must be injected or introduced through a scratch. The converse holds true, that is, in epidermal sensitivity there may be false negative results from introducing the antigen subcutaneously by the hypodermic syringe or on the broken skin by the scratch method.

It should be pointed out at this juncture that, although the skin eruption may have originally been caused by sensitization to one substance only, a sensitivity may develop to a variety of substances. For example, a worker in nickel may develop a dermatitis due to repeated contact with the metal. If the condition is untreated, he will likely, in the course of months or years, become sensitive to a variety of substances. The eruption may be altered by scratching or by the application of irritating lotions or ointments, so that the removal of the original offender will not cause any appreciable improvement for a long time.

It should be borne in mind, also, that a skin may become sensitive to a substance after repeated contact over a period of years. For example: Burgess and Usher<sup>7</sup> reported cases of sensitivity to quinine, which developed following the use of a quinine-containing shaving lotion over a period of years. Thus, one should not conclude that a substance is not an offender from the history that it has been handled for years without ill effect.

There are many puzzling factors in the use and interpretation of the patch test. Often a history will be obtained that an eruption followed contact with a definite substance. Patch tests may be done and the results found to be negative. Nevertheless, on removal of the suspected substance from contact with the patient, the eruption clears. This may indicate faulty technique, or, more likely, is due to the fact that the test does not reproduce truly the factors which caused the eruption. If the test is expected to be 100 per cent reliable, many disappointments will follow its use.

The following cases illustrate the value as well as the limitations of the test.

#### CASE 1

A white female, aged 20, born in Canada, reported at the Dermatology Clinic, Toronto General Hospital, complaining of an eruption on the left wrist and the outer aspect of each thigh. This eruption had been present for two months. She had been wearing a white gold wrist watch and bracelet for about four months, and had been wearing metal plated garter clasps for some years. The rest of the history was unimportant.

On examination, a reddened, slightly scaling area was seen on the volar surface of the left wrist. On closer examination, tiny papules, vesicles and a few crusts were seen in this area. On the middle third of the lateral aspect of each thigh were similar areas. The rest of the skin and mucous membranes were clear, and general examination of the patient revealed nothing of note.

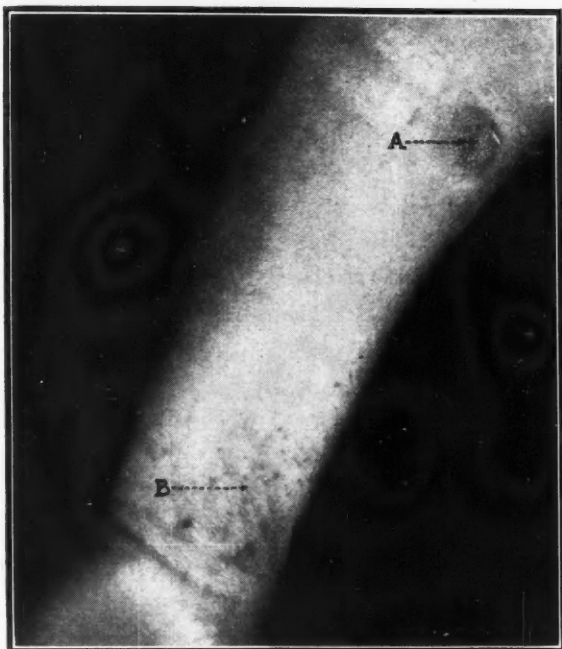


FIG. 1. (Case 1).—Forearm: At "A" the site of the positive patch test with the nickel coin; a slight reaction to adhesive tape may be seen at either side. At "B" the eruption due to the "white gold" wrist watch.

A patch test was done with a nickel coin as white gold contains nickel. The patient reported at the clinic five days later. Beneath the nickel coin the skin was reddened, thickened, scaling, and contained numerous tiny vesicles. The patient said the skin had been irritable since the first day. A photograph was taken at this time to show the patch test and the eruption. (See Fig. 1).

#### CASE 2

A female, aged 35, reported at the Dermatology Clinic, complaining of redness, itching and burning about the external nares and upper lip for a period of six

weeks. On questioning her, it was learned that she had been ordered to use "nasal drops" about two days before the appearance of the eruption. These "drops" contained menthol, eucalyptol and oil of pine in liquid paraffin. She had used the drops twice daily during the six weeks' period. Patch tests and controls were done on her forearm and all were negative. However, she was told to discontinue the drops, and the eruption cleared completely without further treatment and has not recurred.

In conclusion, it should be emphasized once more that the attempt to use this means of diagnosis in lieu of a careful history and examination of the patient will defeat the very purpose of the test. Also, its use as a placebo, to satisfy the patient that something is being done, must be deprecated. It is felt that this test provides a definite addition to the diagnostic equipment of the physician. But, like any laboratory test, it cannot supersede or replace clinical examination. The test reproduces as nearly as possible the conditions which are suspected of causing the skin eruption. However, the interpretation of results must be tempered with clinical experience.

#### SUMMARY

1. The technique of the patch or contact eczema test, with suggested modifications, is described.
2. The reading of the test is next described.
3. The importance of careful history-taking, as a requisite for success in the use of the test, is emphasized.
4. It is pointed out that positive tests, in the absence of negative controls, indicate the presence of antibodies in the epidermal cells.
5. The indiscriminate use of the test is deprecated.

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## COARCTATION OF THE AORTA\*

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COARCTATION of the aorta of the adult type<sup>1</sup> in which we are interested is a congenital acute constriction of the isthmus of the aorta at or near where the ductus arteriosus joins the aorta. The pathology of the condition, including the collateral circulation, has been so thoroughly investigated and described by Abbott,<sup>2</sup> Lewis,<sup>3</sup> Blackford,<sup>4</sup> King,<sup>5</sup> Lichtenberg and Gallagher,<sup>6</sup> Strong,<sup>7</sup> and many others that no attempt will be made to elaborate further on this.

In the past, the diagnosis of this condition has been usually an autopsy, rather than a clinical one, and rarely has a clinical diagnosis been made before adulthood. More cases should be reported, so that physicians may become more familiar with the clinical diagnosis of this condition, which is now considered very obscure and difficult. In the two cases I wish to report, the diagnosis was not difficult when coarctation of the aorta was thought of. That this condition is more frequent than is generally realized and may be diagnosed clinically much earlier was well shown in a report by Lewis,<sup>3</sup> in an outdoor clinic, where he was treating 20 to 30 cases of essential hypertension. It was felt necessary for statistical reasons, routinely, to exclude coarctation of the aorta as the cause of the hypertension. Much to his surprise, he found three cases, and a few months later, under similar conditions, he found two more. These had all been missed previously by expert observers, probably because the condition was not in mind at the time of examination.

Coarctation of the aorta, according to Abbott,<sup>2</sup> was first described by Paris<sup>8</sup> in 1789, yet Abbott in 1928, in giving a summary of reported cases, was able to find only 200 cases of coarctation with autopsy findings. Blackford,<sup>4</sup> in publishing a similar analysis a few weeks later, claimed that coarctation of the aorta occurred once in 1,550 autopsies. According to a recent summary by Lichtenberg and Gallagher,<sup>6</sup> only 250

cases of adult type of coarctation verified by autopsy had been reported to date, and only 25 of these had been diagnosed during life. In 50 other reported cases the diagnosis had been made on more or less substantial grounds.

## SYMPTOMATOLOGY

The symptomatology may be divided into four groups.—(1) Symptoms associated with hypertension in the upper part of the body, such as nervousness, headaches, epistaxis, dizziness, flushing of the face, and a constant high colour. Shapiro<sup>9</sup> quotes Abbott as saying that these patients may be unusually bright, due to the excessive blood supply to the head, and he also states that because of the increased blood supply to the upper part of the body many of these cases may be mistaken for hyperthyroidism. (2) Symptoms due to low blood pressure and poor circulation in the lower extremities, such as numbness, cold feet, tiredness, and vague pains in the legs, and intermittent claudication. (3) Symptoms of overaction of the heart and, later, cardiac failure. (4) Symptoms due to cerebral hæmorrhage.

The important signs are hypertension in the upper extremities, low blood pressure in the legs, with a small retarded femoral pulse. The vast majority of cases show, especially in the later stage, dilated superficial vessels, more marked over the back. Lewis<sup>3</sup> states that even an expert observer very frequently will overlook very marked collateral circulation unless definitely looking for it, and that he himself has done so a number of times. Marked pulsation of the carotids may be noted, and there is generally a very definite capillary pulse. Usually a loud systolic murmur is heard, especially over the left scapular region. The x-ray, as described later, may help.

It is not practicable in every heart examination to examine the femoral pulse, but in every case of hypertension, especially in young persons, this should be done as routine, and if this be done many cases of coarctation that have been

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overlooked in the past will be found. It is important that the correct diagnosis be made so that the activity of the patient may be regulated.

The two cases I wish to report will now be described.

#### CASE 1

A patient, whom the writer saw in consultation with Dr. Donald Porter, of the paediatric service of the Saint John General Public Hospital. He was a white Canadian boy, aged eleven years. His mother said he had been very healthy and active all his life, excepting that as a young child he had some wheezing in his chest and he was always nervous. Two years previously a school physician had reported a heart murmur, but as the child seemed perfectly well, the parents paid no attention to this report.

On the night of the acute onset of symptoms he went to bed as usual, apparently well. His mother was aroused at midnight by his entering her room and saying he could not stand. He collapsed on the floor before she could reach him. He was admitted to the paediatric service of the Saint John General Hospital two hours after the onset. The family physician, Dr. S. H. McDonald, said that the boy was having convulsions resembling those of strychnine poisoning. On admission, the least stimulus caused him to thrash about his arms and legs, and occasionally to assume opisthotonus. Between spasms, at times, there was slight retraction of the head and rigidity of the neck. No signs of paralysis were noted. The pupils were dilated equally and reacted sluggishly. The knee jerks were absent. No ankle clonus was present, and Babinski's sign was doubtful. The Achilles jerks were noted. Abdominal reflexes were questionable. The temperature was 102°; pulse 110; respirations 24; blood pressure 144/110. The pulse was full and bounding. A loud systolic murmur was heard over the mitral area, and a systolic thrill was felt at the apex and not near the sternum. The apex beat was heaving and outside the mid-clavicular line. There was definite dullness over the right lung, with feeble breath sounds.

A catheterized specimen of urine, taken two hours after the first symptoms were noted, showed a marked reduction of Fehling's solution and the presence of acetone. The blood sugar was then 0.24 per cent. On account of the hyperglycaemia, glycosuria, and acetonuria being present only two hours after the onset of acute symptoms a consultant thought that diabetes was a possible diagnosis, so advised giving 10 units of insulin and 400 c.c. of 10 per cent glucose intravenously. Two hours later, a spinal puncture showed bloody fluid, apparently under high pressure, as estimated by the flow of the fluid. The Wassermann test and culture of the spinal fluid later proved to be negative. Four hours after the onset it was noted the white blood cells were 22,400. After eight hours a spinal tap showed bloody fluid, apparently under increasing pressure, and his general condition was about the same. A diagnosis was made of subarachnoid haemorrhage and a congenital heart lesion.

The following afternoon, 20 c.c. of spinal fluid were withdrawn, and 15 c.c. of anti-meningococcal serum were given. The patient voided involuntarily, and occasionally vomited. The blood sugar was now 0.08 per cent, and there was no sugar in his urine.

On the third day his condition was slightly improved. He was semi-comatose; temperature, 102°; pulse, 105; white blood cells, 20,400. On the fourth day, lumbar puncture showed less blood in the fluid and the pressure was apparently not so high. Haemostatic serum was given and repeated the next day. A consultant found retinal haemorrhages in both eyes and a recent plastic choroiditis.

On the sixth day, after the acute illness began, the writer was asked to examine the boy. He was nervous and excitable, and had spasms of the muscles at the

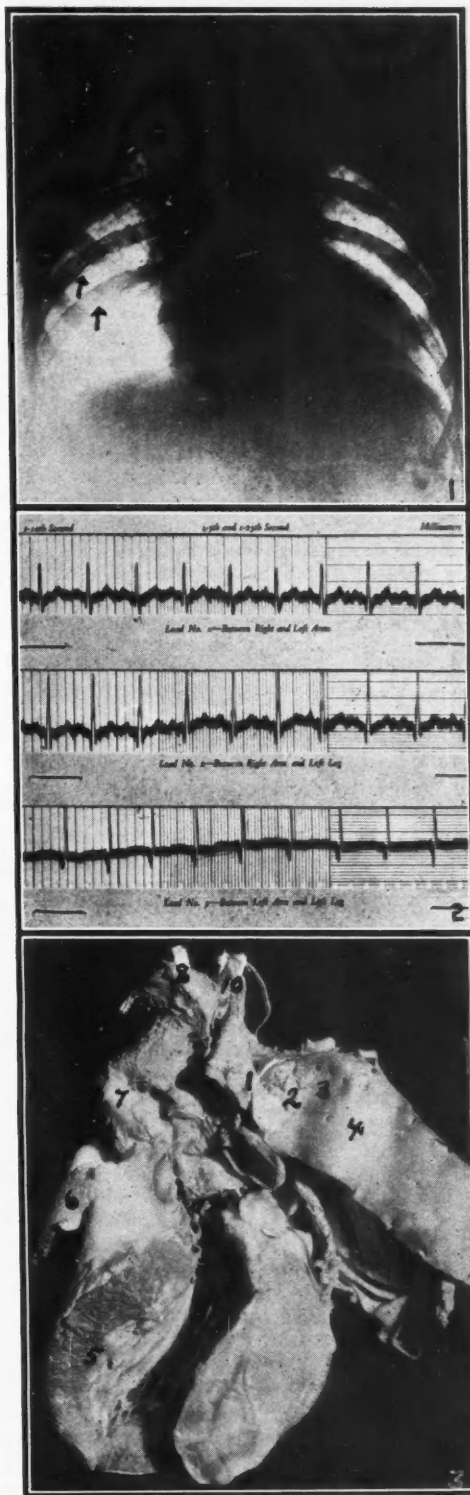


FIG. 1.—Enlarged left ventricle; dilated ascending aorta; absence of aortic arch; descending aorta present; slight erosion of the ribs, 7th and 8th right.

FIG. 2.—Electrocardiogram in Case 1. Although there was great hypertrophy of the left ventricle and a normal right ventricle there was no left axis deviation. A definite Q3 wave shows.

FIG. 3.—The aorta from the constriction downwards has been laid open. (1) Complete atresia of the aorta; (2) organized thrombus; (3) dilated first two intercostal arterial mouths; (4) widened upper part of the descending aorta; (5) much thickened wall of the left ventricle, measuring 24 m.m.; (6) wall of the right ventricle, measuring 6 m.m.; (7) dilated ascending aorta, measuring 32 m.m. in diameter; (8) left carotid artery, measuring 4.5 m.m. in diameter; (9) innominate artery, measuring 10 m.m. in diameter; (10) left subclavian, measuring 5 m.m. in diameter; (11) thickened bicuspid aortic valve (posterior cusp 27 m.m., anterior cusp 21 m.m.). The obliterated ductus arteriosus entered the left pulmonary artery. The internal mammary measured 3.5 m.m.

least touch. He was so irritable that it was very difficult to make an examination. Marked weakness of the left leg and arm were noted. The radial pulse was of good volume and regular. The blood pressure was 140/108, and was equal in both arms. He had a heaving apical impulse over a wide area, and well outside the mid-clavicular line. The carotids pulsated markedly. There was no evidence of collateral circulation, such as dilated prominent vessels over the back. There was a systolic thrill at the apex. A loud systolic murmur was heard over the whole precordium, especially at the second left cartilage, which was transmitted well up into the neck, and over both scapular regions. Examination of the pulse in the legs showed a small left femoral pulse, and a very indefinite popliteal pulse on the left side. No pulse in the right leg or either foot was found. His legs were well developed, of good colour, and warm. It was impossible to get the leg pressure, as the popliteal pulse was so weak and the patient so restless.

An x-ray film (Fig. 1) showed a large heart of aortic configuration, with apparently a dilated ascending aorta, and the absence of the aortic knob. The descending aorta was seen. Erosion of the ribs (Fig. 1), which is usually present and caused by the dilated vessels of the collateral circulation, especially of the intercostals, was noted to a slight degree. X-ray of the skull showed no evidence of fracture. A diagnosis of coarctation of the aorta, with secondary cerebral (subarachnoid) hæmorrhage, was made.

The patient gradually improved, but on the 7th day, for the first time, a facial paralysis of the left side was noted, and the vision was poor in his right eye. On the 12th day he was much better, and his temperature had gradually become normal. The paralysis was definitely improved. On the 24th day there was little sign of paralysis, and he could see clearly with both eyes, but still occasionally vomited. His blood pressure in the arm was 150/115. At this time, he was quiet enough to have an electrocardiogram (Fig. 2) taken, which showed a marked somatic tremor, but no left axis deviation, and, apart from a definite Q3, showed nothing of interest. He continued to be nervous and irritable, but improved slowly and his mind became clear. On the 35th day the family was permitted to take him home, where he remained in bed. His mother stated he had no desire to sit up, but seemed comfortable.

On the 13th day at home he had a recurrence of the former symptoms, but even more severe. He was returned at once to the hospital. On admission, he was unconscious. He had recurring convulsions and Cheyne-Stokes breathing. There was marked cyanosis, with much perspiration. His limbs were rigid. The abdominal reflexes were absent on the left side. On the right side no deep reflexes were elicited, and were but weakly present on the left. The temperature was 102°; pulse, 80; respirations, 24; white blood cells, 26,100. The patient died a few hours later. The temperature rose to 106° just before death.

*Summary of autopsy by Dr. W. J. Baxter.*—No evidence of external deformities or abnormal vessels was found. The right pleural cavity was obliterated by adhesions, and a fibrous nodule was found in the middle lobe of the right lung. The heart was large, with a normal pericardium. Definite collateral circulation was noted, but the vessels were not dilated, as was expected (see Fig. 3 for measurement of vessels). The ascending aorta was considerably dilated. The transverse aortic arch was approximately 12 m.m. in length. The ductus arteriosus was obliterated, and just beyond where it joined the aorta was an acute constriction of the aorta, causing complete atresia. For 3 c.m. beyond the atresia the descending aorta was dilated to one and one-half times the size of the aorta lower down. Just beyond the atresia was an organized thrombus, about 18 m.m. long. This is shown in Fig. 3. The intima of the aorta was smooth. The left ventricle was enlarged, chiefly from hypertrophy, and the wall was 24 m.m. thick, in contrast to that of the right ventricle, which measured

6 m.m. The coronary arteries and heart muscle were normal. The aortic valve was bicuspid. The posterior cusp measured 25 m.m., and the anterior cusp 21 m.m. The cusps were much thickened, and contained thickened organized tissue near the base of each valve on the ventricular side, and not on the aortic side, as was found by LeCount.<sup>10</sup> The other valves were normal.

Removal of the skull cap showed a tense dura and large dilated veins over the pia. Much old clotted blood beneath the arachnoid extended over the base, and was seen below the corpus collosum, extending into both ventricles. The left ventricle was completely filled with fluid and clotted blood. The third ventricle, the aqueduct of Sylvius, and the fourth ventricle were dilated and filled with clotted blood. Section of the brain showed no hæmorrhage in the brain substance. No fracture of the skull, no aneurysm, or other cause of the hæmorrhage were found.

#### CASE 2

A young man, nineteen years of age. Ten years ago, when he had a bilateral pneumonia, he was found to have a heart murmur. A little later a consultant diagnosed a patent ductus arteriosus, because of what he described in his written report as a "machinery" murmur. His orthodiagram at this time showed no aortic arch, and an apparently enlarged rounded left ventricle. The blood pressure was 120/80; pulse, 72; weight, 88 pounds. The patient was seen periodically by the same consultant for five years, until May, 1931. His reports show that at that date the patient was 6 feet 2½ inches tall, weighed 150 pounds, and the blood pressure was 142/70. The orthodiagram (Fig. 4) showed little change

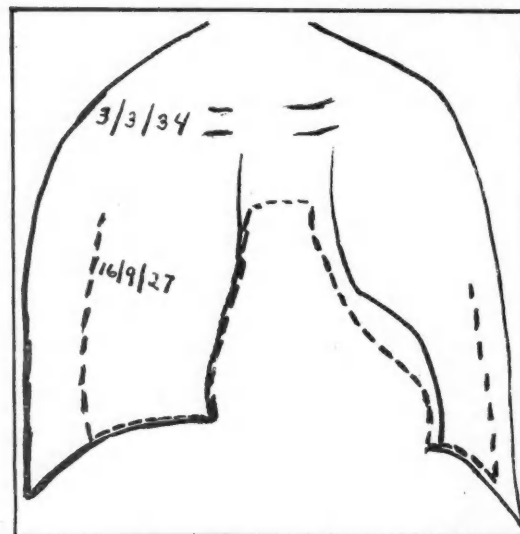


FIG. 4.—Orthodiagram in Case 2. (Broken line at 12 years; heavy line at 19 years.) (1) Shows large ventricle, especially at 12 years; (2) rounded apex of ventricle; (3) absence of aortic knob; (4) apparently no dilatation of the ascending aorta; (5) descending aorta visualized.

in the contour of the heart from those previously taken, excepting that expected in a growing boy. A blowing systolic murmur at the apex and at the left border of the sternum was heard. In the second left interspace was a faint blowing diastolic murmur. These murmurs were now described as more definitely of a "machinery" type than formerly. The systolic murmur was transmitted well into the neck. The electrocardiogram remained the same as five years previously. It showed high voltage and a marked Q3, a slightly widened P wave and PR interval (Fig. 5). Otherwise nothing of interest was noted.

The writer saw this patient a year and a half after this last report. He was apparently a well man, but he

had been refused admission to the staff of a bank by a medical examiner because of heart murmurs. He was well built, 6 feet 2½ inches tall, and weighed 172 pounds. He had no abnormal symptoms, such as palpitation, dyspnoea, pain in the legs, fatigue, headache, cold feet. There was a marked pulsation of the carotids, and a capillary pulse was present. No other abnormal pulsations were noted. His pulse was of good volume, regular, except for an occasional extra-systole. Blood pressure was 160/90; vital capacity was 3,600 c.c. No thrills were found. There was a forcible apical impulse in the sixth interspace, mid-clavicular line. A loud systolic murmur was heard over the precordium, in the neck and scapular regions. Quite a loud diastolic murmur was heard at the third left cartilage. There was a reduplicated pulmonic second sound. Fluoroscopic examination showed a very full rounded apex, almost no aortic knob, and large contractions of the ventricle. The descending

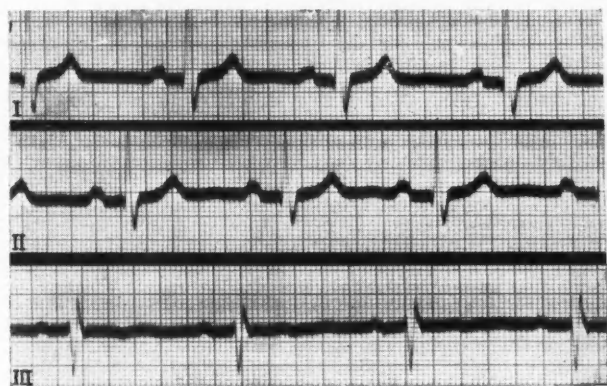


FIG. 5.—Electrocardiogram in Case 2. (1) Widened P wave and PR interval; (2) very prominent Q3 wave, or inverted R wave (Hurxthal II); (3) no change in electro-cardiogram in eight years; (4) high voltage, 20 m.m.

aorta was visualized and the ascending aorta looked normal. On the lateral view the left auricle seemed slightly enlarged, and barium showed the oesophagus to be very slightly displaced. The femoral pulse was very small. It was very difficult to feel the popliteal pulse, and no pulse could be felt in the posterior tibial or dorsalis pedis, on either side. The blood pressure in the leg, over the popliteal artery, was approximately 106 m.m. mercury, by palpation. A few months after this examination, a military board of four consultants passed him for military service, and he was told he had a functional murmur.

This patient has reported at various times since 1932. The blood pressure in the arm was frequently 170, and on one occasion, 200 m.m. After exertion the pressure went up only 20 m.m., but it was sustained for several minutes. When examined very recently, he was in splendid physical condition, and said that when he played Badminton, danced, or went on military hikes, no bad effects were observed. He had been strongly advised against such exertions. His weight was 184 pounds; height 6 feet 2½ inches; blood pressure 180/90 in the right arm, and a few minutes later it had dropped to 166/74. In the left arm it was 146/60. The apex beat was forcible in the sixth interspace, mid-clavicular line, and now a distinct thrill was felt over both clavicles and in the neck. These thrills disappeared a few days later. There was a very marked capillary pulse. Except for the thrills no evidence whatever could be found of a collateral circulation. The radial pulse was of good volume and felt equal on the two sides. His femoral pulse was small on both sides, and there was a definite retardation that could be noted easily with finger palpation. No pulse in either foot, or right popliteal space, was found. The left popliteal pulse was barely palpable, and the blood pressure by palpation was 100 m.m. Hop-

ping on one foot 30 times raised the blood pressure in the right arm to 190 m.m. Later, running up and down stairs twice gave a blood pressure of 190 m.m. and in two minutes it was 180 m.m.

The history of a long-standing, probably congenital, heart abnormality with no symptoms, very marked murmurs, and apparently no change in the physical signs in eight years, and a high blood pressure in the arm, should make one at least think of coarctation of the aorta. An examination of the pulse in the leg showed it to be very small, and the blood pressure low, confirming the diagnosis of coarctation. The electrocardiogram (Fig. 5) showed high voltage, and a definitely abnormal Q3 or inverted R3, (Hurxthal<sup>11</sup>) which has remained constant for over eight years. The orthodiagram (Fig. 4) showed the heart with rounded left apex, slight enlargement, and a very small aortic knob. There was a retarded femoral pulse. The diastolic murmur suggested aortic regurgitation. The regurgitation was probably due to thickened valves which may be bicuspid, as found in 25 per cent of these cases Abbott<sup>2</sup> and Blackford.<sup>4</sup> X-ray examination of the chest in the antero-posterior and posterior-anterior position showed no notching of the ribs.

#### DISCUSSION

Any young person with elevated blood pressure should have the femoral pulse palpated, and the blood pressure in the arm and leg checked. The small and definitely retarded pulse and the low blood pressure in the leg are important points in the diagnosis. The blood pressure in the leg will usually have to be taken over the popliteal artery, as in these cases the pulse in the feet and ankles is frequently not to be felt. To take this pressure one may use the ordinary arm band of the sphygmomanometer, making sure that the cuff is placed over the artery. To keep it from slipping, the band can be fastened in place with a flannel bandage. The blood pressure in Case 2 dropped about 8 millimetres on reclining. On exercise the blood pressure was not elevated as much as one would expect, but the increase in pressure was sustained longer than in the normal person. The radial pulse was of good quality in both cases, and no difference was noticed in the two arms. The blood pressure in Case 2 was definitely higher in the right arm than in the left, and this is frequently found in such cases. There



was a definite retardation of the femoral pulse in Case 2. This is especially well described by Lewis,<sup>3</sup> who thinks that retardation is due to the slowly ascending pulse rather than to the actual delay in time of starting. The retardation of the pulse here was easily demonstrated by palpation. Lewis says it has not been absolutely proved that the blood pressure in these cases becomes high shortly after birth, but he believes this is true. The blood pressure in Case 2 was normal when first noted eight years ago, and has been gradually rising since. In Case 1 the blood pressure was not so high as is usual in these cases. Blackford<sup>4</sup> found it over 150 millimetres in 30 out of 55 cases, and he also found the pulse pressure high. In Case 1, the pulse pressure was not high. In Case 2, while the pulse pressure is high, the patient apparently has an aortic regurgitation to explain this. Blumgart *et al.*<sup>12</sup> say that the most severe case of coarctation may be difficult to diagnose, as the collateral circulation follows a relatively direct route through widely dilated vessels, so may not affect the leg pressure and pulse as would be expected. In both the cases here reported careful examination by inspection, palpation, and the use of the light directed downwards over the back, as suggested by Lewis,<sup>3</sup> failed to show any evidence of collateral vessels, excepting that in Case 2, at one time, thrills were felt above both clavicles, and the x-ray in Case 1 showed a very slight erosion of the ribs. The collateral vessels would probably have developed in patient No. 1, if he had lived long enough, and we may expect them to show sooner or later in patient No. 2, but their absence should not confuse the diagnosis. There was no x-ray evidence of erosion of the ribs in Case 2, and only a limited erosion in Case 1 (Fig. 1).

There was a history of nervousness in patient 1, but no other symptoms such as headache, epistaxis, flushing of the face, numbness of the legs, pain in the legs, fatigue were noted. In patient 2 the face was rather pale, instead of flushed, as is usual with these cases. In both patients, a loud systolic murmur was heard over the precordium, in the neck and scapular regions. The murmur over the left scapular region is, according to Blackford, most characteristic. He also states that no murmur may be present, and this must be remembered. This type of murmur may be suggestive by its

loud systolic character and the direction of transmission, but a patient is under observation at present with a mediastinal tumour causing a murmur identical with that in the above two cases.

Cerebral hæmorrhage in a young person, with no diagnosable cause, should at least make one think of coarctation of the aorta. Lichtenburg and Gallagher,<sup>6</sup> report that 10 per cent of the deaths in coarctation of the aorta are due to cerebral hæmorrhage. In a case of cerebral hæmorrhage with coarctation of the aorta Abbott<sup>2</sup> says the only probable cause of the hæmorrhage is the rupture of an aneurysm which may be so small as to be overlooked at autopsy. It could not be found in Case 1, although looked for very carefully, nor could any cause of the hæmorrhage be found in the massive hæmorrhage. These aneurysms are probably due to a congenital absence of the medial coat at the bifurcation of the arteries, especially about the base of the brain. This congenital absence of the medial coat in this area, according to Forbus<sup>13</sup> occurs so commonly as to be considered normal.

The x-ray examination in both these cases was of great value. In Case 1 it showed an enlarged left ventricle of aortic configuration. Abbott<sup>2</sup> found enlarged ventricles in 150 out of 200 cases. Lewis<sup>8</sup> says that the enlargement is usually due to hypertrophy, rather than dilatation. A dilated ascending aorta was present, and Abbott<sup>2</sup> found this in 101 out of 200 cases. There was absence of the aortic knob, and notching of the ribs was present to a slight degree. The descending aorta was present (Fig. 1). In Case 2 (Fig. 4) the aortic knob was practically absent in repeated orthodiagrams over a period of eight years, and at eleven years of age (Fig. 4) there was definite enlargement of the heart, with a rounded left ventricle. As the patient grew into manhood this enlargement was not nearly so evident (Fig. 4). The x-ray helped to exclude aneurysm and other abnormal conditions. Usually it will show notching, especially to be seen in anterior-posterior plates (Lewis<sup>3</sup>). Occasionally, a physician, reading the x-ray film, can make a diagnosis from this alone. King<sup>5</sup> however, found the x-ray usually of little value, except to exclude aneurysm.

From the clinical examination and history it is difficult to say whether there is complete

atresia or not. Abbott<sup>2</sup> found complete atresia in 37 out of 200 cases. In Case 1 the x-ray picture (Fig. 1) suggested complete atresia, from the dilated ascending aorta, absence of the knob, the enlarged heart, and notching of the ribs. The descending aorta was present, as it usually is in these cases, and frequently may be seen dilated, as it was in Case 1. The absence of all symptoms in the legs, the relatively low arm blood pressure for this condition, absence of visual evidence of collateral circulation, the presence of femoral and popliteal pulses, suggested that the atresia was not complete in Case 1, yet there was complete atresia. In Case 2 the absence of signs of dilatation of the ascending aorta, and the absence of signs of collateral circulation both on physical examination and x-ray, combined with a loud systolic murmur, which may be due to partial stenosis or collateral circulation, suggest that probably there is not complete atresia, but one cannot be certain of this. Quite a percentage of Abbott's cases showed no dilatation of the ascending aorta.

The electrocardiogram was no help in either of these cases (Figs. 2 and 5). It did not show the left axis deviation, as Lewis<sup>3</sup> expects, even though in Case 1 there was a great hypertrophy of the left ventricle and a normal right ventricle. Lewis believes that there will not be great enlargement of the heart without other complications. The famous case reported by Reynaud, and quoted by Abbott,<sup>2</sup> died at 92 years of age with complete atresia and showing no enlargement of the heart.

There is a definite Q wave in Case 1 (Fig. 2) and in Case 2 a very marked Q3 or inverted R3—Hurxthal.<sup>11</sup> There has been no change in the electrocardiogram in Case 2 in eight years. The marked increase in voltage, with the description of a machinery murmur early in this case, according to Abbott,<sup>14</sup> suggests the possibility of a patent ductus arteriosus, which is uncommon in the adult type of coarctation. Neither case had nocturia, although, according to King,<sup>5</sup> this is a frequent symptom, due to the blood pressure and altered circulation. In Case 1 the hyperglycemia, glycosuria and acetonuria two hours after the first symptoms was most puzzling, and added to the difficulty of diagnosis. Rabinowitch<sup>15</sup> said this could occur within eighteen hours of a cerebral injury; Brow<sup>16</sup> said that in experimental animals, it

occurred in about eighteen hours.

The prognosis in coarctation of the aorta is good until adult life, especially if the diagnosis be made and the patient limits his activity. Abbott's<sup>2</sup> chart shows that death usually occurs in early middle life.

The treatment of those cases, is the limiting of violent exercise, so lessening the danger of cardiac failure, rupture of the aorta, cerebral hæmorrhage, etc. King<sup>5</sup> would not accept these men for military service because of the tendency to cardiac failure. Lewis<sup>3</sup> thinks that when cardiac failure occurs it is not due to the high blood pressure, but to some other added factor.

#### SUMMARY

Two cases of coarctation of the aorta, one verified at autopsy, have been described. The diagnosis in each case was not difficult, once the condition was considered, and the pulse and blood pressure in the lower limb were examined. The absence of the appearance of a collateral circulation should not confuse the diagnosis. Hypertension in a young person should suggest the possibility of coarctation. The condition is not so rare as is usually thought. The diagnosis will not be considered obscure and difficult if physicians will have it in mind.

I wish to thank Dr. Maude E. Abbott for generous assistance.

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## STRYCHNINE POISONING IN CHILDREN\*

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IN surveying the cases of poisoning in children it is found that strychnine poisoning plays a very prominent part, both from the large number of cases and the high mortality. On further analyzing these cases it is found that Aloin, Belladonna, Strychnine and Cascara tablets (A.B.S. & C.) are the chief source of the poison. The usual formula of these tablets is Aloin,  $\frac{1}{2}$  grain; Extract of Belladonna,  $\frac{1}{16}$  grain; Strychnine,  $\frac{1}{120}$  grain; and Extract of Cascara Sagrada  $\frac{1}{2}$  grain.

In a survey of the poisoning cases treated at the Hospital for Sick Children, Toronto, from 1919 to 1933 it was found that there were 35 cases of strychnine poisoning and 6 of these had a fatal termination; 28 of the cases and 5 of the deaths resulted from the ingestion of A.B.S. & C. tablets. The children most frequently poisoned are those between the ages of 1 and 5 years. As soon as the child is able to walk and climb on chairs he may obtain a bottle of the tablets, and, finding the chocolate coating very palatable, swallows a large number of them, sometimes as many as 80 or 90. Although each tablet contains only  $\frac{1}{120}$  gr. strychnine the child may readily obtain considerably more than the lethal dose, and if vomiting is not induced very soon or gastric lavage is not given the result is inevitable.

Statistics elsewhere reveal a similar high death rate from the accidental ingestion of this drug in children. In New York State (exclusive of New York City) there were 158 fatal poisonings from all causes in children five years of age and under, between the years 1926 to 1932 inclusive, and strychnine accounted for 75 of these deaths.

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The poisoning was chiefly due to the three cathartic and tonic pills, A.B.S. & C., A.B. & S., and Hinckle's Cascara, as pointed out by Aikman.<sup>1</sup> These last tablets contain  $\frac{1}{60}$  grain of strychnine sulphate.

Mortality statistics of the U. S. Bureau of Census<sup>2</sup> show that in the years 1926, 1927, 1928 there were 178, 179, and 189 deaths, respectively, from strychnine poisoning in the registration area of the United States, which covered 95.4 per cent of the total population. Even these mortality figures are considered to be lower than the actual death rate from the drug, and when estimated on the basis of the reported cases in New York State they are found to be 239, 228 and 225, respectively, in children under 5 years of age. Mortality figures for strychnine poisoning in the Dominion of Canada<sup>3</sup> for the years 1931, 1932 and 1933 were furnished by the Dominion Bureau of Statistics, and show that there were 18, 23 and 11 deaths, respectively, in children under 5 years of age, or a total of 52 deaths in 3 years.

From these figures it is evident that although cases of strychnine poisoning in any one community may be fairly infrequent in any particular year, yet taken over the continent as a whole and over a period of years they assume surprisingly large proportions. The poisoning usually results from the ingestion by the pre-school child of the commonly used cathartic and tonic tablets which are usually considered by the parents to be quite harmless. With these facts in mind it would seem highly advisable to entirely remove the strychnine from the formulæ of such tablets.

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## THE DIAGNOSIS AND MANAGEMENT OF ACUTE CHOLECYSTITIS\*

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AT the meeting of the American Surgical Association in Washington in May, 1933, three papers were presented discussing surgical treatment in acute cholecystic disease. Stone's paper<sup>1</sup> advocated urgent operation in all cases of acute cholecystitis. Judd<sup>2</sup> reserved urgent operation for a small group of cases. Smith,<sup>3</sup> after practising urgent operation in this disease, had reverted to the more conservative management of such patients.

The lack of heated discussion condemning urgent operation, which is at variance with the practice of our surgical staff, prompted a survey of the material available in the Toronto General Hospital and in private practice. The public ward cases of acute cholecystitis were analyzed, covering a period from July 1, 1926, to January 1, 1934.

TABLE I

PUBLIC WARD CASES—TORONTO GENERAL HOSPITAL  
JULY 1, 1926, TO JANUARY 1, 1934

Total number .....	153
Youngest .....	14 years
Oldest .....	75 "
Average age .....	44 "
Total mortality—10 cases (6.5 per cent).	
Autopsies—7 cases: 5, stone in the common duct.	
Days ill prior to admission—average, 6.	
Days after admission till temperature normal—average, 5.5.	
Average white blood cells—14,700.	
Average elevation of temperature—100.3°.	

One hundred and fifty-three cases were accepted for analysis, excluding cases in which there was any doubt as to the accuracy of the diagnosis. This doubt obviously applies only to the cases not operated upon.

A second analysis of 52 cases operated upon in private practice from January 1, 1921, to January 1, 1934, was undertaken.

TABLE II

GROUP OF PRIVATE CASES FROM  
JANUARY 1, 1921, TO JANUARY 1, 1934

Total number .....	52
Deaths .....	4—7.7 per cent
Immediate operation .....	7
Delayed operation .....	45
(Included 11 patients with perforation of the gall bladder, none of whom died following operation).	
Drainage .....	20
Removal .....	32

\* Read at the meeting of the Ontario Medical Association, Toronto, on June 29, 1934.

In the diagnosis of acute cholecystitis the difficulty is not so great as might be imagined. The difficulty lies only in the group of cases where, because of an alternative diagnosis, urgent decision is required as to the necessity of an immediate operation to save life. Three cases were diagnosed as perforated duodenal ulcer; 3 diagnosed as acute appendicitis, and 1 as a pancreatitis. The rarity with which pancreatitis can be accurately diagnosed, together with its almost inevitable association with a diseased gall bladder, renders this diagnosis scarcely a definite error. This is the only case in this group of erroneous diagnoses in which a death occurred. The differential diagnosis of cholecystic disease, renal disease, coronary thrombosis and respiratory disease is not of such urgency that a precipitate operation need to be done; hence there is ample time to further investigate the patient and clarify the diagnosis. It is rare to find a patient suffering an acute cholecystitis who does not give a long history of a cholecystic indigestion, accompanied by one or more attacks of abdominal pain, which may be interpreted as due to biliary colic. The radiation of the pain, and the association of pain and tenderness which remain constant in the right upper quadrant, with the absence of rigidity elsewhere, render the diagnosis relatively easy.

It is imperative to differentiate between acute cholecystitis and an acute cholangitis. We have come to rely on the palpation of the enlarged gall bladder for this purpose. In a former analysis of histories of patients<sup>4</sup> suffering from jaundice accompanying cholecystic disease it was found that jaundice as an accompaniment of acute cholecystitis was responsible for more jaundiced patients than was stone in the common duct. Therefore we feel that jaundice associated with a palpable gall bladder is due to an extension of oedema to the common bile duct from the inflamed pouch of Hartmann of the gall bladder. On the other hand, the presence of jaundice and fever, and no palpably enlarged gall bladder, demands urgent drainage of the biliary system by the most simple

and atraumatic operative procedure. That is, we believe operation is urgent in acute cholangitis. The real point at issue, however, lies in the proper treatment of such patients, once the diagnosis is established. It has been stated repeatedly, and it is agreed, that an analysis of the clinical history and physical examination, even by the most astute clinician, is incapable of accurately assessing the local pathological lesion. This is probably true to a greater degree in cases of acute cholecystitis than in most acute intraperitoneal lesions. It has been our experience that two essentially identical clinical histories and physical examinations may reveal on the one hand a mild local lesion, or on the other hand a degree of involvement in which necrotic patches are present on the gall bladder, with or without a pericholecystic abscess. The involvement of the general peritoneal cavity, the result of a gross and extensive disturbance in the region of the gall bladder, is fortunately very rare. In 508 cases reported by Judd<sup>2</sup> from the Mayo Clinic, 3, or 0.59 per cent, had general peritonitis. In this group 2, or 1.47 per cent, had general peritonitis. This small percentage of general peritonitis associated with acute cholecystitis of itself serves to make any analogy between acute cholecystitis and acute appendicitis untenable. The infrequency of acute cholecystitis accompanied by peritonitis is due to two factors—first, the rich blood supply of the gall bladder, which permits excessive œdema and distension of the organ before an ischæmia followed by necrosis will develop; secondly, the anatomical structures situated about the gall bladder readily become adherent to it and thus wall off the general peritoneal cavity.

In the management of a patient suffering from acute cholecystitis, as carried out by the Surgical Service of the Toronto General Hospital, an attempt is made to defer operation. Sleep is ensured by means of the application of local heat and the administration of requisite sedatives; dehydration and starvation are corrected by the intravenous administration of fluids and glucose. Unless pain is persistent without any signs of diminution, and unless the patient's general condition is becoming progressively worse, operation is withheld until the temperature has been normal for varying periods, at which time one may then perform

an elective operation. There is thus an opportunity to assess the patient's general condition and treat any associated disease processes. The incidence of diabetes and cardiovascular disease in this group of patients has been astonishingly frequent. We firmly believe that the pre-operative safeguarding of these patients from their associated disease is of the utmost value in securing an ultimate success. The argument that the delay is accompanied by a serious economic time loss and additional expense does not in the least appeal to us, providing we can satisfy ourselves that it makes for increased safety. The average interval of delay between admission and operation was only twelve days. That certain of the patients, upon recovery from their acute symptoms, will refuse operation is not the surgeon's responsibility. In the public-ward group of 153 cases, 24 patients refused advice to be operated upon, and in 61 cases, for various reasons, no operation was advised. This leaves 68 cases upon whom an operation was carried out.

TABLE III  
PATIENTS OPERATED ON

Total number .....	68
Deaths .....	4—5.8 per cent
Immediate operation—6: death, 1—16 per cent.	
Delayed operation—62: deaths, 3—4.8 per cent.	
(Drainage .....	16—deaths, 3
Removal .....	46— “ 0)

In 6 an immediate operation was carried out. In 7 there was an error in diagnosis, 3 being diagnosed as acute appendicitis, 3 as perforated duodenal ulcer, and 1 had an acute hæmorrhagic pancreatitis with no acute cholecystitis. In 62 a delayed operation was performed. Sixteen patients had drainage of the gall bladder and 46 had the gall bladder removed. In the 46 cases in which the gall bladder was removed there were no deaths. Among the 16 patients in whom drainage alone was established there were 3 deaths. It is interesting to note that the interval between the patient's admission to hospital and operation in the cholecystostomy cases was only a half day shorter than in the cases in which cholecystectomy was performed. In view of the fact that these patients were operated upon by all the members of the staff, the experience and attitude of the individual surgeon, together with the extent of the local lesion, explains why drainage was carried out,

as all are agreed that cholecystectomy is the ideal procedure.

An analysis of the three cases in which death occurred following drainage and a delayed operation shows that with one exception the disease process, and not the operation or the time of its performance, seemed to be the deciding factor. The one exception was a case in which there was an error in judgment in mistaking the induration of the hepatic colon which resulted from the pericholecystic inflammation as being due to carcinoma, and a side-tracking anastomosis accompanying drainage of the gall bladder resulted in death from peritonitis. Today such a situation would be solved by doing a cæcostomy. The second patient, following a ten-day delay, had the gall bladder drained, and died of a post-operative acute pancreatitis; at autopsy stones were found in the common bile duct. It seems incredible that an earlier operation in this case would have changed the ultimate issue. Indeed all, I think, are agreed that to open the common duct in the presence of an acute cholecystitis is highly undesirable. The third patient was operated upon after a three-day delay and died one month later from progression of a pancreatitis. In the 6 cases in which immediate operation was undertaken there was one death. The gall bladder was drained. There was a very severe pancreatitis, from which the patient succumbed, and at autopsy stones were present in the common bile duct.

It has been argued against delay that a large percentage of patients die during the period of observation. In this group, in which 85 were not operated upon, there were six deaths in hospital:

TABLE IV  
PATIENTS NOT OPERATED ON

Total .....	85
Refused operation .....	24
Deaths .....	6
(a) 3 admitted moribund; all had stones in common duct.	
(b) 3 died of cardiovascular disease.	

This could easily be construed, statistically, as showing that the danger of no operation was greater than the danger of operation. However, an analysis of these 6 cases reveals the fact that 3 of the patients were admitted in a moribund condition and died shortly after admission. The other 3 all had serious cardio-

vascular disease accompanied by myocardial failure, precluding any possibility of operation, and being directly responsible for death. It is interesting to note that the three who were admitted in a moribund condition all had, in addition to the acute cholecystitis, stones present in the common bile duct, with an accompanying cholangitis. Thus in the 68 cases in which operation was performed we have to report 4 deaths, giving us a mortality of 5.8 per cent. In the analysis of the 52 cases of acute cholecystitis occurring in private practice, which covered an additional period five and one-half years prior to the hospital group, the gross mortality was 4, or 7.7 per cent.

The patients early in this series were operated on with a shorter period of delay than were the later group, as represented by the public ward series. Twenty, or 38.4 per cent, of the private cases were drained, as compared with 17, or 23.5 per cent, in the hospital series. This would not have been necessary had a longer interval elapsed between admission to hospital and operation. In this group, in only two cases were stones recognized in the common duct. How many may have been overlooked and removed elsewhere in the cases which were simply drained? This urgency of operation is further reflected in the mortality of 7.7 per cent.

Our private records are only of the cases operated upon, and hence the deaths recorded are all operative deaths. The causes of the four deaths were as follows: one patient had an associated acute pancreatitis, and died of a pulmonary embolus during convalescence; one had stones in the hepatic and common ducts and died of post-operative general peritonitis. The gall bladder was simply drained here. One had had five former operations on the gall bladder. This operation removed the gall bladder. The patient died of general peritonitis. We removed the gall bladder and drained the cystic duct. Jaundice persisted. A second operation was done six weeks later, and no stone found in the common duct. Chronic pancreatitis developed and the patient died on the seventh day of pneumonia.

One is thus forced to the conclusion that operation undertaken sooner after admission would probably not have changed the issue in regard to the mortality in this group; but



would a longer delay have prevented the two fatalities from general peritonitis? Both these patients were operated upon within seventy-two hours of admission.

When the mortality rate was determined in our own cases, we were interested in the mortality rates published by other surgeons. Miller<sup>4</sup> reports 13.5 per cent mortality; Whipple and Bell,<sup>5</sup> 13.7 per cent; H. F. Graham<sup>6</sup> 6 per cent; Zinninger,<sup>7</sup> 7.8 per cent; Love<sup>8</sup>—delayed, 13 per cent, immediate, 21 per cent. This favourable comparison of our results with those recently published gives certain assurance that immediate operation in acute cholecystitis is not necessarily essential. It may be argued that our experience with immediate operation is only confined to 6 cases, and therefore we are not in a position to speak with any degree of authority on this type of treatment. However, in Stone's thesis he reports a 33 per cent mortality in the delayed operation, as compared with our 3 deaths in 62 delayed operations, which is 4.8 per cent. In the immediate operation he reports a 19 per cent mortality, as against, even in our small group of 6 cases with 1 death, 16 per cent, which of course in such a small group has no significance.

It has been suggested that the leucocyte count and temperature are of help. In this group of cases the average leucocyte count was 14,700, and the average elevation of temperature was 100.3° and bore no constant or definite relation to the extent of the local gall bladder lesion.

Zinninger has made the statement that if one could operate upon these patients within forty-eight hours of the onset of symptoms there would be, as in his experience, no mortality, while in the group which he operated upon between two and five days he had a 6.6 per cent mortality, and in those upon whom he operated after five days there was a 25 per cent mortality. We do not have the opportunity in our service of seeing these patients within forty-eight hours. The average duration of the illness on admission of the 153 public patients was six days, and it is interesting also to note that the average length of time from admission to hospital until the temperature became normal was five and a half days. Further, in the 10 cases in which death occurred, autopsy was obtained in 7, and in 5 of these stones were present in the common duct. It becomes obvious, therefore, that, with the universal opinion against opening the common duct in acute cholecystitis, urgent operation would

not be sufficient to rid such patients of their disability.

Thus, while our experience in early operation in this disease is only limited to seven cases, we are forced to the conclusion that to delay operation is not particularly disastrous when we compare our mortality with published mortality. Could we have the opportunity of seeing patients in the first forty-eight hours of their illness we would probably advise operation at an earlier date; yet if we did see patients at this stage would we diagnose an acute cholecystitis? Would it not be more likely that our diagnosis would be acute gall stone colic? We believe this clinical state precedes almost all cases of acute febrile cholecystitis. Hence an early operation for repeated or persistent biliary colic prevents rather than cures acute cholecystitis. While urging a conservative course in the management of patients suffering from acute cholecystitis, one must be ever on guard to avoid a delay which allows the disease to progress unfavourably.

In this group of cases a few patients were operated upon before the temperature became normal, when after a few days' treatment there was no great improvement in the local pain and tenderness. The pre-operative treatment designed to overcome fatigue, dehydration and its associated biochemical changes, improved the patient's general condition, and permitted an opportunity to assess and treat any associated disease process. By this treatment the operative risk is materially lessened. In short, if after a few days' treatment the local pain and tenderness is not definitely diminished, as in our experience occurs in the vast majority of cases, one should, as soon as the patient's general condition warrants, advise operative interference.

#### CONCLUSIONS

1. The experience of the surgical staff of the Toronto General Hospital would seem to warrant continuing in the present attitude with regard to the treatment of acute cholecystitis as seen in hospital practice.

2. In our group the total operative mortality has been 5.8 per cent; in the delayed group, 4.8 per cent.

3. The diagnosis of acute cholecystitis may be confused with acute appendicitis and perforated duodenal ulcer, where urgent operation may be desirable. This clinical picture brings the cases

early in the disease, and operation which was undertaken seven times because of these errors resulted in one fatality, which was beyond operative control.

4. Acute cholecystitis with jaundice must be differentiated from acute cholangitis due to common duct obstruction. The presence of a palpable gall bladder confirms the former diagnosis in most instances.

5. Early operation in this group of hospital cases has been impossible, because the average length of time between the onset of disease and admission to hospital was six days.

6. The increased time consumed and the expense incurred prior to operation are justified by the lower mortality.

7. Immediate operation will fail to completely cure a large percentage of cases, because of the presence of stones in the common duct.

8. Early operation will not prevent a tragedy if stones are present in the common duct, as one of our cases subsequent to operation developed an acute pancreatitis, which caused death, and at autopsy a calculus unrecognized at operation was present in the common duct.

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### THE TREATMENT OF GLAUCOMA\*

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IN 1929, in the *British Journal of Ophthalmology*, I discussed the non-surgical treatment of glaucoma. Part of that discussion reviewed the reported results with a group of relatively new preparations, chiefly from the literature. I am glad now to bring this old report up to date, since after 5 years most of these methods of treatment have been put to the test of clinical use. Some have been dropped as having no advantage over methods already in use; others have assumed a definite place in the treatment of certain types of glaucoma, and it is of the indications for these which I wish to speak today.

It must be repeated that most cases of glaucoma and especially of primary glaucoma, will, sooner or later, require surgical intervention. Most of us have seen more harm done in cases of glaucoma by delaying surgery than by operations improperly performed. This is due chiefly to late diagnosis, failure to use the tonometer and perimeter as a routine where any suspicion of glaucoma arises. It is also due,

unfortunately, to the fact that many well-trained ophthalmologists do not have enough confidence in their operative skill or experience to insist upon surgery when the proper time for it arrives. The fear of possible operative failure should never lead one to persist in non-surgical treatment when records of fields and tension show that the condition is not under control.

There are certain conditions, however, in which it is advisable to postpone surgery, or in which it may be avoided entirely. In chronic glaucoma the chief reason for this will be extreme age or infirmity of the patient. Cutting down of the field close to the fixation-point is sometimes considered as contra-indicating operation, but wrongly so, I believe, since loss of central vision after a successful operation really is of rare occurrence and is not to be compared in seriousness to the loss which occurs inevitably in an uncontrolled case without operation. A patient who has lost one eye after a previous operation naturally hesitates before a second operation and may refuse it. In such a case, after explaining the probable consequences, we must do what we can. In acute primary glaucoma, when the case is seen

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very early, it may be possible to avoid operation; in secondary glaucoma the cause may be removed or the underlying inflammation may be treated so as to make operation unnecessary.

In *acute glaucoma* our line of conduct will depend upon how early the case is seen. If the condition has existed for several days, operation can almost never be avoided, and should not be delayed longer than the few hours necessary for the proper preparation of the patient. Eserine, 1 per cent, will be instilled several times at intervals of a minute, and this may be repeated at half-hour intervals. The use of morphine is usually indicated for pain and its miotic effect aids that of eserine. A saline purge may be of use by depleting the body fluids and so exercising an indirect osmotic effect on the intra-ocular fluids. These measures may reduce the intra-ocular tension to some degree, and a tonometric measurement of initial and subsequent tension is much better than the fingers in recording this. Such a reduction of tension is desirable, to facilitate local anaesthesia and to reduce the chance of hæmorrhage following surgical decompression of the eye. Not more than a few hours should be lost in such procedures, however, in such a late case, and we must depend on the reduction of tension on the operating table by retro-bulbar injections of novocaine-adrenalin. If 4 minims of 1:1,000 adrenalin are added to the syringe containing 1.5 c.c. of 4 per cent novocaine much more effect on tension will be obtained than if the novocaine-adrenalin as usually prepared is employed. If one waits ten or fifteen minutes after such an injection, it is not uncommon to find the tension reduced ten to twenty millimetres, or even to normal. Hence in our hands the retro-bulbar injection has replaced almost entirely the much more dangerous posterior sclerotomy which was formerly used as a preliminary to operation on eyes with very high tension. It is also the only means of assuring good local anaesthesia in acute glaucoma, where one formerly was often obliged to employ general anaesthesia. I am glad to see that Col. Wright,<sup>1</sup> in a recent paper, lays great stress on these means of reducing tension before operation.

In a case seen during the first 24 hours of the attack there will be more hope of reducing the tension to normal, so that operation can be done under more favourable conditions, or even avoided altogether. Here, in addition to the measures already described, there will be time

for a form of osmotic therapy more efficacious than the saline purge. This is the intravenous injection of hypertonic solutions. Such solutions make the blood hypertonic and it rapidly extracts water from the tissues, including those of the eye. (The same mechanism accounts for the marked hypotony seen in cases of diabetic coma with very high blood sugar.) Duke Elder<sup>2</sup> has reported a fall of tension from 95 to 38 mm., and another from 58 to 20 following intravenous injections of sodium chloride. Thirty-five to 50 c.c. of 30 per cent, or 100 to 150 c.c. of 10 per cent sodium chloride may be employed. Injections of sodium chloride must be given slowly and very carefully, since any solution injected outside the vein causes a slough. The use of 50 per cent glucose solution is more convenient, as it is apt to be on hand in hospitals for use in reducing intra-cranial pressure, and it has the additional advantage of not causing a slough when injected outside the vein though it also must be injected with care. One hundred to 250 c.c. of the 50 per cent solution must be injected, or 200 to 500 c.c. of the 30 per cent solution, according to the size of the patient.

I have seen a number of remarkable drops in tension from the use of both sodium chloride and glucose. In one case of glaucoma following discission the tension fell from 60 Schiotz to 23 within six hours after the injection of salt solution and was then kept normal by miotics.

#### CASE 1

Another patient, Mr. W., had lost most of the vision in one eye before a successful operation for glaucoma was performed by a colleague 7 years before. An attack occurred in the second eye after cholecystectomy, and when I saw him tension was 70 Schiotz. Miotics were begun, and 100 c.c. of 50 per cent glucose were injected by vein, plans being made to operate later in the afternoon. After 3½ hours the tension was found to be only 18, so operation was postponed. It remained 14 to 18 during his stay in the hospital and never went above 28, even after miotics were discontinued. Peripheral iridectomy was performed some months later because of the patient's fear that an attack might occur when on a long journey.

#### CASE 2

Mr. T. suffered an acute attack in the left eye following its occlusion after operation for chronic glaucoma of the right eye. Tension was 82. One hundred c.c. of 50 per cent glucose was given by vein. One-half hour later tension was 65, three hours later 38, nine hours later 30, and twenty hours later 13. In spite of miotics it rose slowly during the following days to 45, and three days later iridencleisis was performed with an excellent result.

In acute glaucoma where the ordinary miotics meet with such resistance one would think of "amin-glaukosan", as proposed by Hamburger,<sup>3</sup>



who undoubtedly succeeded in aborting some attacks by means of its use. It produces severe chemosis and inflammation, however, and this increases the difficulties and dangers of operation where this becomes necessary. I have seen such a reaction from it in one case that I have never used it since.

There is one relatively minor procedure which may be successful in aborting an acute attack where operation is impossible or must be delayed too long for safety, namely, a simple paracentesis by a small limbar puncture. This may be done at home with no other equipment than a syringe of 2 per cent cocaine, a speculum, fixation forceps, and a small sharp cataract knife.

#### CASE 3

I was called to see Mrs. C. at home by her physician. I was told that the patient was suffering an acute myocardial failure, would probably not survive it, and must under no circumstances be operated upon. Mrs. C. had lost the sight of the right eye eight years before with acute glaucoma, and when I saw her tension in the other was 65 Schiotz, with vision reduced to hand-movements. After pushing eserine for an hour, a marginal paracentesis was done in her bed, and eserine was continued. The next day tension was normal. Vision rapidly returned to 20/25 and remained so until her death, which, in spite of her physician's opinion, did not occur until four years later!

In *chronic simple glaucoma*, one will nearly always give a thorough trial to the usual miotics. Here 1 per cent pilocarpine or 0.2 per cent eserine is usually efficacious in securing miosis, and there is seldom any reason for employing stronger miotics, whose unpleasant effects would become intolerable after a time. In most cases, the miotics are successful in reducing tension to normal for a time. In a certain number of cases this effect may continue indefinitely. It is important to check progress in each case by frequent fields, however, and to remember that the tension varies during the day in glaucoma patients, so that one whose tension is always normal when seen in the office may have higher tension at other times, especially during the night, which will cause gradual deterioration of the fields. Hence tensions should be taken, at various times of the day, and, especially, early in the morning before any miotics have been used. The danger of miotics is of over-confidence in their effect, and a patient using them must be under constant surveillance.

General examination of patients with chronic glaucoma is indicated, but there are few general conditions which have been proved to have a direct influence on glaucoma. This is certainly

true of focal infection, so important in other conditions, and while definitely infected foci, such as root-abscesses, should be taken care of, one seldom sees a very definite effect of such treatment on the intra-ocular tension. And certainly there is no reason for advising surgical intervention on "suspicious" tonsils or sinuses in cases of chronic glaucoma.

There is one condition which has been brought to my attention by some work of Dr. Herbert Barker, on which I hope to report later. This is oedema due to the binding of water in the tissues by sodium chloride. Blood chemistry will reveal a slight relative alkalosis, with a slight decrease in blood chlorides. This means that chlorides as well as water are bound in the tissues by sodium. Elimination of sodium chloride from the diet, with the substitution of potassium chloride used freely as table salt, with a diet designed to leave an acid ash will cause the oedematous tissues to give up their water in a manner which is sometimes most surprising. In some cases ammonium chloride is also given in doses of 6 grams a day. There is another theoretical reason why a treatment designed to lessen alkalosis should reduce intra-ocular tension. This is the fact demonstrated by Redslöb and others that the vitreous humour shrinks in volume with very slight increases in acidity. An extreme result of this is seen in the ocular hypotony of patients in severe acidosis. This idea has been carried out in a few cases of chronic glaucoma with tension hovering slightly above normal in spite of miotics. In two cases the effect was apparently quite definite, the tension dropping from 35 to 25 Schiotz, and being maintained so to date. In several others normal tension has been maintained, but other factors may have played a part in the result. The same idea of combating a faulty water metabolism was at the basis of reports from Germany on the effect of various diuretics such as novazurool and theobromine on ocular tension, but the practicability of their continued use in such a chronic condition may well be doubted.

When the use of miotics and the general measures mentioned above, (which, it must be stated, are still in the experimental stage) fails to control tension and fields, one will usually advise operation. Under special conditions demanding delay, other measures become necessary. The most important agent at our disposal in such cases is certainly adrenalin and its

derivatives. The value of adrenalin in glaucoma has been brought out chiefly by the work of Hamburger since 1923. While 1:1,000 adrenalin, by instillation, showed no dependable effect on tension, he found that subconjunctival injection of 4 minims of the 1:1,000 solution caused a marked fall of tension in most patients. It was accompanied by mydriasis, but occurred to an equal degree when mydriasis was prevented. A sharp rise of systemic blood-pressure followed such injections, and in some cases this caused faintness or even collapse. Hence Hamburger substituted for the usual *lævo*-rotatory adrenalin, its *dextro*-rotatory isomer, which produced the same effect on ocular tension, but without raising the blood-pressure. This soon came into wide use in Germany under the trade-name "Glaukosan".

To avoid the difficulties of injection he then tried solutions of ordinary adrenalin more concentrated than 1:1,000, and found that a 2 per cent solution produced the same effect as subconjunctival injection of the ordinary preparation. This with certain unimportant additions, was called "Links-glaukosan" or "Glaukosan tropfen", in English "*Lævo*-glaukosan". On account of the expense of this imported article John Green, of St. Louis, has had prepared by the Metz Company ampoules of suprarenin bitartrate. Two c.c. of distilled water added to an ampoule gives a 2 per cent solution, the effect of which is identical with that of *lævo*-glaukosan. Both preparations are used only by instillation, 2 drops being placed in the sac while the lids are held open for 30 seconds. This is repeated three to five times at 15 minute intervals for a maximal effect. It should be preceded by a drop of local anæsthetic.

Gradle<sup>4</sup> showed that when 4 minims of ordinary 1:1,000 adrenalin are placed on a cotton pledget in the upper fold for four minutes enough absorption occurs to produce an effect similar to that of a subconjunctival injection. In my experience such an adrenalin pack does produce almost, if not quite, as marked an effect as *lævo*-glaukosan or injection. In 50 cases in which one of these methods was employed a definite decrease in tension nearly always occurred. The tension went below 25 Schiotz in 42 cases. The average decrease was 10 mm., reaching 20, 23 and 24 mm. in certain cases. All cases were under miotics, but with tension remaining above normal. Miotics were con-

tinued, and in 13 cases the tension remained normal for longer than a week, in 5 for longer than a month. A number were kept under control for 8 to 12 months by repeating the treatments, but in many cases later treatments were less effective and most cases finally came to operation. A few cases were unaffected by adrenalin, and where one attempt has failed nothing is to be gained by further attempts. The principal indication for adrenalin is in chronic simple glaucoma. In secondary glaucoma many authors recommend the method which seemed ideal, in that tension was reduced without contracting the pupil. I have seen in several such cases, however, an acute rise of tension, and must agree with Vannas<sup>5</sup> that adrenalin is contra-indicated in types of glaucoma accompanied by inflammation. In glaucoma following cataract operation or discission, however, the same objection does not seem to hold, and I have seen a number of such cases in which adrenalin has controlled the tension until normal drainage was re-established without operative interference.

Even in chronic simple glaucoma there is some danger that an acute rise of tension may occur following adrenalin. Apparently the mydriasis which occurs at first is the cause of this, converting the slight primary rise of tension which is normal into a marked one. I have seen this occur in several cases, and now always precede adrenalin by 3 drops of 0.2 per cent eserine at 10 minute intervals before a treatment and one drop every half-hour for the next two hours, or for long enough to keep mydriasis from occurring. The danger seems to be over in six to eight hours.

As an adjunct to miotics in cases almost but not quite controlled by them certainly adrenalin has shown itself of very great value. The same cannot be said of other proposed therapeutic measures in this type of glaucoma. Puitritin and barium, mentioned in my paper above referred to, seem not to have proved their value. At least there has been nothing convincing about them in the literature since that time. I have tried the use of calcium by mouth and by injection in many cases, for theoretical reasons. Its use has no draw-backs, but I cannot claim to have seen any very definite effects on the ocular tension from it. A new miotic, "Doryl", has been described in the German literature by Velhagen<sup>6</sup> and others. It is carbaminöylcholin, not a derivative of either eserine or pilocarpine,

and hence might be of value in persons sensitive to both these drugs. In 0.75 per cent solution it is said to be superior to 2 per cent pilocarpine but inferior to 0.5 per cent eserine in its effect on the pupil.

*Secondary glaucoma* contains such a large assortment of conditions that it cannot be systematically discussed here. Treatment will in most cases depend upon the cause. In iritis with secondary rise of tension one hesitates to use miotics, and here paracentesis, repeated after several days if necessary, will often keep the tension within safe limits until the inflammation is controlled by treatment directed against the cause and large doses of sodium salicylate. Adrenalin, I feel, is dangerous here, though a number of ophthalmologists have used it with good effect. A drug which would affect tension when given orally or subcutaneously would be exceedingly useful here. And we have such a drug in ergotamine, or "Gynergen". This is prepared from ergot, and besides causing contraction of the uterus, depresses the end-organs of the sympathetic nervous system. It is supposed to decrease the permeability of the capillaries and in this way its effect on intra-ocular tension may be explained. It is dispensed in ampoules, one-half an ampoule containing the usual dose for subcutaneous injection, 1/250 grain, which is usually repeated twice a day. Tablets of 1/60 to 1/30 grain are also dispensed for oral use, 2 or 3 tablets three times a day being given, but the effect of oral administration has been by no means so definite as that of injection. By injections of ergotamine I have seen drops in tension from 30 to 18, 37 to 17, 35 to 20, and 40 to 25 mm. In chronic glaucoma it may be easily seen that a drug requiring two daily injections is impractical, but in a few cases of glaucoma following cataract operation, and especially in one case of sympathetic ophthalmia, the effect of gynergen was most valuable, and in several cases a dangerous operation was avoided entirely. Unfortunately, not all cases react alike to the drug, and in certain cases it proved absolutely ineffective. As previously stated, in glaucoma following cataract operation or discission adrenalin may prove of great value. Rises of tension after discission are much more common than is generally believed, and have caused me to avoid atropine altogether before and after discission, homatropine being used when mydriasis seemed absolutely necessary.

When glaucoma after cataract operations resists miotics and the measures described, cyclodialysis, as pointed out by Elsehnik, seems the operation of choice, as the filtering operations are here especially dangerous and apt to prove ineffective. I regard this as the principal indication for cyclodialysis, and consider that for this indication alone one is obliged to master this simple but exceedingly delicate procedure.

To summarize briefly the non-surgical procedures in glaucoma, it may be stated that after the use of miotics the procedure of most value in acute glaucoma is intravenous injection of hypertonic solutions, in chronic glaucoma the use of the adrenalin group, and in secondary glaucoma, ergotamine. The effect of salt-free and acid-ash diet in chronic glaucoma is being studied with interest.

In chronic glaucoma I have never seen any reason for employing iridectomy in any of its forms or cyclodialysis. A filtering operation is the only form of procedure which offers an excellent chance of permanently reducing tension, and a decision to undertake it should not be delayed when a case is not under control by other means. Whether one chooses corneo-scleral trephining, sclerecto-iridectomy according to Lagrange, or iridencleisis will depend on one's training, but every ophthalmologist should be the master of at least one of these three procedures. I prefer iridencleisis in most cases, as less liable to certain well-known complications than trephining. It is so much easier to perform that it should commend itself to the surgeon of limited surgical material. It seems ideal in buphthalmos, as illustrated in a group of cases recently reported.<sup>7</sup>

In cases of chronic glaucoma a tension above 45 to 50 in spite of miotics I feel that a recurrence of tension is more likely after iridencleisis than after corneo-scleral trephining and employ the latter procedure in such cases.

Cyclodialysis, as stated, is reserved for glaucoma after cataract operation or after partial dislocation of the lens.

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## BLENDED FISH OILS FOR MEDICINAL PURPOSES

## 1. PRELIMINARY LABORATORY AND CLINICAL TESTS

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FOR many years cod liver oil has been recognized as the standard source of the oil-soluble vitamins A and D; and frequently the fact that other fish oils may be equally or more potent is overlooked. Cod liver oil, as sold for medicinal purposes, is not necessarily a single oil, but may be a mixture of oils from the livers of the cod, pollock, hake and other members of the same family. Numerous tests have shown that the oils from the various species of *Gadus* are similar in physical and chemical properties and in vitamin potency. The United States Pharmacopœia recognizes this and defines cod liver oil as "a fixed oil from the fresh livers of the *Gadus morrhua* and of other species of *Gadus*". The British Pharmacopœia recognizes as cod liver oil only the oil from the liver of the *Gadus morrhua*, although it is well known that cod liver oils sold in the United Kingdom may also contain the oil from the livers of related species.

Recent research has shown that oils from certain fish other than the *Gadidae* are valuable sources of the vitamins A and D. In the case of halibut, salmon and tuna (tunny) liver oils the potencies are many times that of cod liver oil, and these highly potent oils are proving of great value in both prophylactic and curative therapeutics. Other fish oils are known to contain vitamins A and D in greater or lesser amounts than does cod liver oil, and the writers have made extensive experiments on the chemical, biochemical and clinical properties of various blends of these lesser known oils. An investigation has been commenced with the following objects in view: (1) the development of a blend of oils of satisfactory vitamin A and D content, the uniform potency of which can be rigidly controlled by specifications concerning the quality and amount of the component oils;

(2) to lower the cost of such an oil in order that it might be available to those people who are in the greatest need of accessory food factors; and (3) the development of a further outlet for high quality Pacific coast fish oils.

This communication is the first of a series on this subject and concerns the properties of an oil blended from Canadian pilchard oil and grey-fish liver oil.\*

*The raw oils.*—British Columbia pilchard oil is produced from the pilchard, *Sardina caerulea*, which frequents the west coast of Vancouver Island in large schools. The oil is obtained by heating the fresh fish in continuous cookers, pressing the hot mass in screw presses and allowing the oil to separate from the press liquors. The oil thus produced is light brown in colour and possesses a not-unpleasant odour and taste. Grey-fish liver oil is obtained from the fresh livers of the grey-fish, *Squalus sucklii*, by a simple steam rendering process. The livers contain up to 60 per cent of a pale yellow oil which has an odour and smell not unlike cod liver oil.

TABLE I  
ANALYTICAL CHARACTERISTICS OF PILCHARD OIL  
AND GREY-FISH LIVER OIL<sup>1</sup>

	Pilchard oil	Grey-fish liver oil
Colour in Lovibond units	20.0Y 1.2R	2.7Y 0.2R
Specific gravity at 25° C.	0.9140	0.9055
Refractive index at 25° C.	1.4785	1.4714
Acid value	0.2 to 4.0	0.57
Saponification value	193-199	156-166
Iodine value	173-183	112-115
Unaponifiable matter (percentage)	0.1-0.3	4.5

\* It is proposed to call these blended oils "Thalattol" (*θαλαττα*, the sea) and steps have been taken to register this name. Oils sold under the name "Thallatol" will have to conform to rigid specifications set by the Pacific Fisheries Experimental Station of the Biological Board of Canada.

Some physical and chemical properties of these two oils are given in Table I.

Of the two oils pilchard is the more unsaturated, as shown by its iodine value of 173 to 183. On the other hand, this oil deposits considerable stearin when cooled, whilst grey-fish liver oil remains clear almost to 0° C. Therefore, before blending for medicinal purposes the pilchard oil is chilled at 6° C. and most of the solid stearin removed by filtration. The unsaponifiable matter of the grey-fish liver oil consists largely of the unsaturated hydrocarbon Squalene, with smaller quantities of cholesterol and higher alcohols.<sup>2</sup> In common with cod liver oil, both these oils contain highly unsaturated fatty acids of high molecular weight, and apart from their vitamin content their nutritive value would appear to be the same as cod liver oil. It was shown by Brocklesby and Denstedt<sup>3</sup> that commercial pilchard oil is a good source of vitamin D, whilst Finn<sup>4</sup> found it to contain vitamin A. It might be mentioned here that this oil gives anomalous results for vitamin A content when testing by the Carr-Price colorimetric method, biological tests indicating a higher potency than the colorimetric. Grey-fish liver oil has been found to be from five to ten times more potent in vitamin A than cod liver oil<sup>5</sup> but it is only from one-tenth to one-third as potent in vitamin D<sup>6</sup>.

*The blended oils.*—The samples of blended oils were made by mixing 1 part by volume of grey-fish liver oil with 4 parts of pilchard oil. In all cases the oils were made from perfectly fresh material, and the blended products were as palatable and as free from odour as the best grades of medicinal cod liver oil. A comparison of the analytical constants of a blended oil with those of a medicinal grade of Norwegian cod liver oil is given in Table II.

TABLE II

	Blended oil	Norwegian cod liver oil
Colour in Lovibond units	1.2R 18.0Y	1.1Y
Specific gravity at 20° C.	0.9242	0.9224
Iodine value	170.0	163.2
Acid value	0.77	0.72
Unsaponifiable matter (percentage)	2.70	0.78

It will be observed that the blended oil is slightly more unsaturated than the cod liver and might therefore be more susceptible to oxidative

rancidity. This is of importance, since the oxidative changes that accompany the development of rancidity tend to destroy vitamin A. Considerable work has been done, therefore, on the relative susceptibilities of the blended oils and cod liver oil to oxidative rancidity. By methods involving the measurement of the inductive period, rate of peroxide and aldehyde formation, and the Kreis test (the details of these tests are not given here), it was established that the blended oil had a slightly greater tendency to undergo oxidative rancidity, but the difference between the two oils was small.

However, further experiments were made to find the stability of the vitamin A in the two oils. In this series of experiments the conditions were made to simulate those obtaining during the actual use of the oil in the household. The oils were kept in standard 12 oz. bottles in a dark cupboard at room temperature. Every week about 25 c.c. of oil was removed, so that at the end of 8 weeks the bottles were only half full. As the volume of air in the bottles increased, the amount of oxidation increased. The effect on the vitamin A was measured by the Carr-Price colorimetric method and the results are shown in Table III.

TABLE III  
EFFECT OF STORAGE OF OILS DURING USE  
ON THE VITAMIN A POTENCY

Sample	Concentration used for test, percentage	—Blue value—	
		Beginning	End of 7 weeks
Cod liver oil	10	6.5	6.0
Blended oil No. 2	5	13.3	12.5
Blended oil No. 3	10	12.5	11.1
Pilchard oil	20	2.7	2.7
Grey-fish liver oil	5	17.2	17.0*

\* This sample was not used for the blended oils Nos. 2 and 3 but for the blended oil used for the clinical tests. Blended oils Nos. 2 and 3 were made from a grey-fish liver oil which gave a blue value of 5.2 units for a 0.25 per cent solution.

At the end of seven weeks there was a definite decrease in the blue value of both the cod liver oil and the blended oils. The decrease, however, was about the same in each case, and therefore the vitamin A in the blended oils appears to be as stable as that in cod liver oil. The same care in handling and storage of cod liver oil should therefore suffice for the blended oils.

#### BIO-ASSAY AND CLINICAL TESTS

The first large quantities of the blended oil were made from grey-fish liver oils of exceed-

ingly high potency which apparently can be obtained only in certain seasons of the year. These blended oils gave Carr-Price blue values for vitamin A ranging from 12 to 25 units in 10 per cent solution, as compared to 3 to 12 units for various cod liver oils. The blended oils were used in a number of public institutions throughout western Canada in the place of cod liver oil and in every case the physician in charge reported very encouraging results. These pertained mainly to increased weight and greater resistance to colds, results attributable to the high vitamin A content. However, the writers desired to carry out clinical tests under their own observation, and a new lot of blended oil was made up. Unfortunately, grey-fish liver oils of only medium high potency were available at the time, and since the opportunity for the clinical tests extended only for a period of a few months these oils had to be used. They were incorporated with a high grade pilchard oil, in the proportion of four parts of pilchard oil to one of grey-fish liver oil. Although of lower potency than was desired, the resulting blend was of higher vitamin A content than the Norwegian cod liver oil used for comparison. The cod liver oil, however, was more expensive than the blended oil and was of the grade supplied to government institutions. The vitamin potencies of these two oils are shown in the following table.

TABLE IV  
VITAMIN POTENCIES OF BLENDED AND COD LIVER OIL

		Vitamin A		Vitamin D
		Carr-Price technique blue colour units conc. % units	Bio-assay inter- national units	Bio-assay inter- national units
Cod liver oil	10	3.3	...	33
	20	5.2		
Blended oil	10	4.5	375	20
	20	7.3		

The clinical test was carried out on a group of Prince Rupert school children ranging in age from 8 to 10 years. These children were divided into 3 groups of 39, 35 and 27 individuals respectively. The first group received the blended oil, the second group the cod liver oil, and the third group constituted the controls. The oils were administered daily just before lunch, five times a week, in doses of 4

drams. No oil was given during the week-ends, but during the Easter recess the children received the oils in their own homes. The test extended over a period of 17 weeks.

Previous to, and at the end of the test period, the children were given a thorough physical examination. Data were also obtained from the parents and teachers regarding the children's health with particular reference to previous infectious diseases or other illnesses which might contribute to faulty development. During the progress of the test the children were weighed weekly in their indoor clothes on a spring balance. The oils were very well tolerated. In only two cases was any difficulty experienced. The difficulty in both cases consisted in severe constipation, and, peculiarly enough, both the children were receiving cod liver oil. The blended oil appeared to be as easily taken as the cod liver oil.

After careful deliberation it was decided to base the conclusions of the test on the following clinical findings: weight increase, condition of teeth, condition of tonsils, and incidence of colds. The following is a brief summary of the results.

*Weights.*—Weight increases were inconclusive. Partly due to poor equipment and partly to the fact that the children were weighed in their full clothing, which varied considerably with weather conditions, the weights showed wide fluctuations and were not amenable to statistical treatment.

*Teeth.*—The results in this case were also not greatly significant. This is not surprising in view of the low vitamin D content of the two oils.

*Tonsils.*—The condition of the tonsils showed a definite benefit through the use of either of the two oils. The control group showed a higher percentage of diseased tonsils at the end of the test period than at the beginning. In the other two groups, however, not only was there a smaller number of defective cases but the majority of diseased tonsils found in the first examination were definitely improved. The two oils seemed to be equally efficient.

*Colds.*—The most marked results were obtained on the incidence of head colds. At the time of the first examination colds in the head were quite prevalent and the number of cases was evenly distributed throughout the three groups. At the end of the test period, the



group which received the blended oil showed no colds whatever; 15 per cent of the cod liver oil group had colds and in the control group more than 25 per cent were affected. These results, admittedly not entirely conclusive, could hardly be explained on an epidemic basis, as the children in the various groups were scattered throughout three classrooms and were therefore substantially exposed to the same infections.

Whilst realizing that evidence gathered from parents is in general not reliable, it appears to be worth recording that in most cases the parents of those children receiving oil reported a marked decrease in head colds and throat infections. The teachers of the classes which received oil were quite emphatic that the general health of their pupils had been bettered, as evidenced by their attendance records. An examination of the records substantiated this claim, and since the greater number of absences are due to the occurrence of common head colds this appeared to corroborate the clinical findings.

As has already been intimated, the writers were not entirely satisfied with these preliminary clinical tests nor with the oil tested. Since the above work has been completed, a new blend of oils has been developed (by the use of an entirely new method of extraction) which shows excellent promise. This blend can be standardized so as to contain at least 800 units of vitamin A and about 75 units of vitamin D; it should therefore be an effective prophylactic agent. At the present time this new blend is being tested clinically under more satisfactory circumstances than the test here reported. Better clinical equipment has been secured and, in addition to medical examina-

tions, thorough dental examinations are being made. It is planned to publish the results in this *Journal* at a later date.

#### SUMMARY

1. An investigation has been started with the object of producing a low-priced, blended medicinal oil, *the potency of which can be accurately controlled.*
2. A blend of grey-fish liver oil and pilchard oil has been examined chemically, biochemical-ly, and clinically.
3. The blend compared favourably with a Norwegian cod liver oil. It was found to be as stable as the cod liver oil and equally as efficient as a prophylactic.
4. The investigation is being continued on a new blend of oils.

The writers wish to thank Miss C. A. Mitchell and Miss E. Cavalier, teachers, who so willingly cooperated in carrying out the clinical test reported here. They also wish to thank Miss W. C. Bunn, R.N., who made the weekly weighings and who assisted in the medical examinations.

Thanks are also due to the Gyro and Rotary Clubs of Prince Rupert who defrayed the expenses of the clinical test. The chemical and biochemical work was done in the laboratories of the Pacific Fisheries Experimental Station of the Biological Board of Canada, and the writers wish to thank various members of the staff who assisted in this investigation and the Biological Board of Canada for permission to publish these preliminary results.

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SILICOSIS AND PRIMARY CARCINOMA OF THE BRONCHUS.—M. J. Fine and J. V. Jaso report a case in which primary carcinoma and silicosis in the lung co-existed. The reason for reporting the case is that they are of the opinion that the combination of the two diseases is not uncommon and that its apparent rarity is due to the fact that an insufficient number of cases of silicosis come to necropsy. These occupational dusts are chemical irritants. In the light of our knowledge of the part played by chemical irritants in the causation of cancer, it is not inconsistent to expect silicosis to be followed by carcinoma occasionally. The authors sound a warning that one must not make a hasty diagnosis of tuberculosis because a patient has symptoms suggesting pulmonary tuberculosis without careful study. A careful history in their case would have suggested a diagnosis of silicosis rather than tuberculosis. The similarity of

symptoms in the early stages of pulmonary tuberculosis, silicosis and primary carcinoma of the bronchus renders the diagnosis somewhat difficult. Early bronchoscopic examination would have revealed the new growth. Hilus carcinoma is by far the commonest variety. More than 90 per cent of cases fall into this group. The tumour is obviously bronchogenic, commencing in a bronchus and spreading along the bronchial tree and into the lung substance. It may originate in the bronchus outside the lung. The lesion without the bronchus varies from a mere roughening of the mucosa to a complete stenosis. Primary carcinoma of the bronchus in conjunction with silicosis is comparatively rare. All workers whose occupation entails exposure to the dust hazard should have their chest roentgenographed at the start of work, and at periodic intervals thereafter.—*J. Am. M. Ass.*, 1935, 104: 40.

## THE RADIOLOGICAL ASPECT OF RIGHT UPPER ABDOMINAL PAIN\*

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IN a recent survey, made by the writer, of a large series of cases operated on at the Bigelow Clinic for the relief of right upper abdominal pain, the following conditions were found: chronic cholecystitis in 45 per cent; adhesions and bands alone in 16; duodenal ulcer in 9; carcinoma of the stomach in 4; multiple cysts of the liver, carcinoma of the pancreas, diverticulum of the duodenum, gastric ulcer, polyposis of the stomach, carcinoma of the liver, obstructive jaundice (gall stone impaction), subphrenic abscess, hernia of diaphragm, carcinoma of hepatic flexure of the colon, right hydronephrosis in 1 per cent each. In 15 per cent of the cases there was no demonstrable disease in the right upper quadrant. In this latter series of cases the lesion was found in the right lower quadrant, and consisted of chronic appendicitis and ileo-cæcal bands and adhesions. The tenderness and duodenal deformity demonstrated in the right upper quadrant were reflex and spastic phenomena, the sure precursors of later disease in the right upper quadrant if the lesions elsewhere were left untreated.

**Duodenal ulcer.**—In the diagnosis of duodenal ulcer the radiological findings have now become classic. They consist of the characteristic incisura and the niche opposite. The incisura is produced by spasm of the circular muscle fibres opposite the ulcer; the niche is produced by the barium-filled ulcer crater. The niche may not be apparent on examination, but can be elicited by pressure of the examining hand under the fluoroscope or by pressure from a rubber bag when taking the radiogram.

While duodenal ulcer usually has a classic symptomatology, yet in rare cases the symptoms may be masked by complications, such as adhesions or gall bladder disease, or changed in the presence of partial obstruction to the outlet of the stomach. The diagnosis should therefore always depend on the radiological findings. A

lesion of the duodenum should be demonstrable radiologically in 100 per cent of the cases, although, rarely, it may not be possible to identify exactly the nature of the lesion.

**Duodenal bands and adhesions.**—These are definite entities. They are analogous to similar conditions found in the ileo-cæcal region. Bands or membranes are congenital in origin, but usually are aggravated by superadded inflammatory processes. Adhesions are always inflammatory in origin, and depend on prior trauma or localized inflammation, such as cholecystitis, duodenal ulcer, or other localized processes, as a duodenitis.

The radiological indications of duodenal bands or membranes, or adhesions, are as follows. Firstly, there is a deformity of the duodenal cap, not the sharp incisura of ulcer, but the more regularly outlined smooth deformity produced by external pressure. Secondly, there may be a drawing-up of the second part of the duodenum vertically or laterally to the right, far from its usual position. And, in the third place, the second part of the duodenum may be enlarged and retain the barium for some time, in contrast with the normal quick emptying of the viscus. This may be the result of a constriction of the third part of the duodenum in the region of the ligament of Treitz, or it may be the end-result of a duodenitis.

The treatment of bands and adhesions of the duodenum by surgical methods gives good results when it is thoroughly done. This is evidenced by a report published by Dr. Cromarty of the end-results in 40 cases. These cases were operated on in the Bigelow Clinic, and the results, as obtained in response to a questionnaire, were very encouraging. The operation consists of freeing the duodenum thoroughly from the constricting bands or adhesions and allowing the organ to resume its normal position and form. As a result of the operation the symptoms were reported to be improved greatly in 80 per cent of the cases,

\* Part of a symposium held at the Annual Meeting of the Manitoba Medical Association, in Winnipeg, on September 10, 1934.

and slightly improved in 15. Epigastric pain, which had been present in 61 per cent of the cases, was entirely relieved in 33 per cent and much improved in 55. Belching of gas, which had been present in 61 per cent of the cases, was greatly improved in 55 per cent of the cases operated on. Epigastric tenderness, which was complained of in 50 per cent of the cases, was cured in 57 per cent and relieved in 29. Nausea and vomiting, which were present in 30 per cent of the cases, were relieved in 80.

*Pyloric stenosis.*—Attention has been called by Dr. Kirklin recently to pyloric stenosis in adults. He has been able to diagnose this condition radiographically. The radiological appearance is a narrow neck of barium extending between the pylorus and the duodenal cap.

#### CHOLECYSTOGRAPHY

The value of the Graham-Cole test of gall bladder functional activity is soundly established. In 1925, one year after the method was first announced by Graham, the writer showed at the annual meeting of the Manitoba Medical Association films demonstrating this new procedure. In 1931 he showed at the annual meeting of the same Association the results of its use in 650 cases, of which 70 had come to operation. The conclusions then reached were: firstly, as a test of the presence of gall bladder disease the method is correct in 95 per cent of the cases; secondly, as a test of the absence of gall bladder disease, the method is of no value, (a diseased gall bladder may function normally); thirdly, as a test of gall-bladder function the method has its greatest value. We have now used the test in nearly 1,000 cases, and the above conclusions have been amply confirmed. The chief value of the test is to indicate at what stage of gall bladder disease medical treatment should be abandoned and surgical intervention be employed. A gall bladder, however diseased, if it is functioning normally according to this test, should generally be given a chance to recover under medical treatment. The only exceptions to this rule are empyema of the gall bladder, uncontrollable attacks of gall-bladder colic, and persistence of the gall-bladder syndrome under well regulated medical treatment.

Another contribution which cholecystography has made is the new conception which it has given us of the anatomy of the gall bladder in the living subject. It has shown us that the

gall bladder, so far from being a fixed organ, is capable normally of occupying almost any position in the right abdomen. One of the first surprises of this test was to find a normally functioning gall bladder lying beside the fourth lumbar vertebra. Another feature is the remarkable changes in the size and position of the gall bladder in response to a fatty meal. It reduces in size by half, and may change its position from three to four inches. This new conception of the gall bladder, as viewed by the x-ray, is analogous to the contribution of the x-ray in the understanding of the entire gastrointestinal tract. It has shown that there is no classic position or shape for the normal stomach. There are as many varieties of stomach appearances as of noses on our faces. The size and shape of the stomach correspond to bodily habitus. A stout person's stomach is transverse and high. A thin person's stomach is J-shaped and low. Both are normal, if they function normally. The x-ray has largely done away with the bugbear of visceroptosis. We no longer subject people regularly to operations for supposedly ptosed organs. Our offices are no longer cluttered up with belts and pads and other devices for the support of visceroptosis. Through the x-ray we have come to recognize that function, and not position, is the important factor.

#### GRAHAM FUNCTIONAL LIVER TEST

Graham, one of the originators of cholecystography, has modified this test to make it also a measure of the functional capacity of the liver. While we understand little of the functional testing of the liver, yet the method of Graham is a rough estimation of the ability of the liver to withstand the strain involved in surgical removal of the gall bladder. He changes from the ordinary dye used in the functional test of the gall bladder by using isoiodoikon instead of iodoikon, that is, instead of tetra-iodo-phenolphthalein he uses phenol-tetra-iodophthalein. By so doing he obtained a dye that was capable of staining the blood serum upon the addition to the latter of a little alkali. Thus the amount of the dye excreted by the liver in a given time was estimated by the colorimetric method. Normally the liver excretes 85 to 90 per cent of the dye from the blood in one-half hour. If the amount excreted falls below 50 per cent the patient is not a good surgical risk. Since adopt-



ing this test Graham has been able to reduce the operative mortality from 6 to 0.5 per cent in simple cholecystectomy.

#### INTRAVENOUS PYELOGRAPHY

Right-sided abdominal pain is frequently due to a right hydronephrosis. In the absence of signs of kidney infection, namely blood or pus in the urine and urinary frequency, the method of retrograde pyelography is not indicated. Under these conditions the use of skiodan or uroselectan intravenously is of great value. The dilated pelvis of the right kidney is strikingly brought out by this method of intravenous urography.

#### THOROTRAST

In recent journals reference has frequently been made to thorotrast as a method of diagnosis in diseases of the liver and spleen. Thorotrast is a preparation of thorium dioxide, a metal of the radio-active class. It is absorbed by the reticulo-endothelial system of the body. By its use it is possible to visualize organs never before seen with the x-ray, viz., the bone marrow, pulmonary alveoli, kidney, placenta, liver, spleen, and the lymphatic system. But its use is not unattended with danger. It has the character-

istic of all radio-active substances, such as radium, x-ray, etc., namely, that it produces a very slow cumulative effect. It takes from seven to twelve years for the full effect to be established. Further, in the short time it has been in use, it has been known to produce degenerative effects in the livers of animals in which it has been used. The Council on Pharmacy and Chemistry of the American Medical Association has recommended that thorotrast be not accepted for intravenous administration. It is a dangerous method. Leave it alone for the next ten years at least.

#### SOME LIMITATIONS OF X-RAY

In the use of the x-ray in the diagnosis of the cause of right upper abdominal pain some precautions should be borne in mind. In acute intestinal obstruction, especially if the small bowel be the site of obstruction, the barium meal should never be given. In this condition a single film will often show the distended loops of small bowel. In acute perforation of the stomach or small bowel a barium meal should never be given. In partial obstruction of the large bowel a barium meal may complete the obstruction, and should never be given unless the facilities are at hand for doing a prompt colostomy. The barium enema is most valuable in this condition.

### THE MANAGEMENT OF THE INGROWING TOE-NAIL

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**I**N the surgical outdoor department one meets many maladies which are minor, in the sense that the lesion may be small, yet are major conditions to the patient suffering from them. Often they inconvenience, or even handicap, the patient, in that earning capacity is greatly interfered with, or, in more grave conditions, suspended. The ingrowing toe-nail, onychocryptosis, belongs to this group. Included also here are milder conditions, in which there is redness and tenderness of the adjacent lateral skin, with some swelling, and on examination the nail is found covered at the lateral margin by overlying œdematous skin, though the subcutaneous tissue may not be broken; also the

nail may be thick, corrugated, and deformed, so that slight boot pressure affects it more easily.

The causes of ingrowing toe-nail are many and varied. It is most frequently due to improper cutting of the nail too far back at the corners, thus allowing the adjacent tissue to bulge over the side of the nail. When pressure occurs, this sharp corner digs in and causes irritation, which, under the ever-present infection in the area, will lead if untreated from the milder to the graver forms of the condition. Another common cause is the crowding together of the toes from badly fitting footwear. In workmen a frequent cause is trauma to the nail

and the nail-bed, which results in a deformed nail.

For the sake of description and treatment onychocryptosis may be divided into three groups. First, the mild form. In this type there is redness and swelling along the skin at one or other, or both, of the lateral borders of the nail. On examination, one generally finds the lateral corners of the nails on one or both sides cut well back, and that the adjacent skin is overhanging or has a tendency to do so. In the early cases, the skin or subcutaneous tissue is not broken, or, if it is, very little infection is present. The treatment of this type of case is: correction of the footwear and instruction to the patient to use warm footbaths of a mild boracic solution, and in future to cut the nail across, so that the corners remain protruding or gently rounded off. In the outdoor clinic, in this type of case, along with the above, the area between the nail and the adjacent lateral skin is packed with absorbent cotton, impregnated with Tinct. Ferri Perchloridi. The method of doing this is to tease out the absorbent cotton and to soak it with the Tinct. Ferri. Perchloridi. solution, then with a toothpick or some fine instrument, taking the edge of the absorbent cotton, to work it gradually down beside the lateral margin of the nail. A dry dressing to the toe completes the procedure. This treatment has a triple purpose—the pushing back of the skin, the hardening of the irritated area, and the application of a mild antiseptic. The patient is instructed to return in two days, when the procedure is repeated. Paring the centre of the nail may be done. This works well when there is no infection present, and even in cases when the infection around the nail is not severe.

The second group of cases comprises those in which the infection is more severe and of longer standing, and in which there is a heaping-up of granulation tissue over the lateral side or sides of the nail. In this type of case, if the infection can be made to subside by hot footbaths and rest of the member, partial lateral removal of the nail and the underlying nail-bed, with the removal of the granulation tissue at the edge, is carried out. In this removal, with the application of a tourniquet to the toe, an incision is carried back at the desired point through the base of the nail and the cuticle, almost to the inter-phalangeal

joint capsule of the distal joint. A curved incision is made from the line of division just proximal to the junction of the cuticle and the nail, laterally and forward, just outside the granulating area and around the distal end of the nail to the point of removal. This flap is dissected up, the lateral part of which is undercut, so that a flap skin-graft is left. Then the whole area—nail, nail-bed, and granulating area—is removed *en bloc*. The proximal part of the flap is returned to its place, and a suture is placed at the cuticle margin. The undercutting allows the lateral flap to drop in and over the raw area where the nail-bed has been removed, and also to act as skin-graft to this area. If the ingrowing is bilateral and infection too extensive a total removal of the nail, not including the bed, may be carried out, with subsequent treatment to relieve the infection. The nail is allowed to grow again, but in recurring cases a removal of the nail-bed is done as soon as the field is clean, with subsequent skin-grafting to hasten the period of disability.

The third group includes those in which there is gross deformity of the nail, the edges of the nail press in, due either to trauma or "idiopathic" onychogryphosis, and those that recur after repeated removal of the nail has been carried out. In this group the only satisfactory treatment, when the condition is interfering with the livelihood of the patient, is eradication of the nail and the nail-bed. If infection is present, this must be cleared up. The removal of the nail and the nail-bed with its subsequent granulation is a slow process, and often means a loss of time of from ten to twelve weeks, with the attendant risk of infection and osteomyelitis of the terminal phalanx. The disadvantage is overcome in some clinics by removing a part of the terminal bony phalanx at the time of the removal of the nail-bed, turning up the soft flap and suturing it to the former cuticle margin. This has the disadvantage of shortening the toe and often leaving a tender end. As the ingrowing toenail is so much more common in the big toe, these conditions are to be avoided. It was with the idea of shortening the period of disability, of lessening the danger of nail-bed infection, and of retaining a certain amount of pad on an area which has been accustomed to taking

pressure, that in this group of cases it was decided to cover the area at the same time as the nail-bed was removed with full thickness "pinch" or "Davis" skin-grafts. This procedure is as follows. A tourniquet is applied to the base of the toe, a horseshoe-shaped incision carried across the skin at the distal border of the nail and the two limbs carried along, clear of the lateral nail margins, to a level just distal to the joint capsule. The area of the skin covering the base of the nail is very carefully freed and turned back. The whole area, including the nail and the nail-bed, from the joint capsule to the incision at the tip of the toe, is removed *in toto*. The flap at the base is then returned to its original position and held by lateral sutures of silkworm gut. The raw area is covered completely by full thickness "pinch" or "Davis" skin-grafts, taken from an area higher up on the leg and placed close together resting on the periosteum. The grafts are held in place by a covering of gauze, one or two layers thick, stretched across the toe. This is covered by a thick layer of gauze soaked in paraffin. The tourniquet is removed and the toe bandaged. There may be some bleeding, but this is taken up by the gauze and it is never excessive. As these patients are treated in the outdoor department, they are instructed to return on the following day, when the dressing down to the gauze covering the grafts is removed, great care being taken not to disturb the gauze which is actually holding the grafts in place. Gauze soaked in liquid paraffin usually prevents sticking. If sticking does occur, hydrogen peroxide is used to loosen the gauze, care being taken not to disturb the grafts. This is continued for eight to ten days, when the deepest layer of gauze is removed and the wound dressed. By this time the grafts are well taken and only a protective dressing with vaseline or liquid paraffin need be used. A piece of marine sponge may be used for keeping the grafts in place. After the first or second dressing, the patients are perfectly comfortable and return for dressing every second day. After two or three days they are able to return to their usual work, and have no more discomfort. Thorough removal of the

nail is more difficult than the description indicates. If it is not thoroughly done everywhere, especially back at the base and under the skin of the lateral margins, distorted pieces of nail are sure to appear and cause trouble. The scar left after this procedure is pliable and free from tenderness, and there is a lesser danger of infection of the terminal phalanx.

I am of the opinion that no operations carried out on ingrowing toe-nails with the slightest infection should be done under local anaesthetic and tourniquet, and if a local anaesthetic is unavoidable in no case should adrenaline be used. When a tourniquet and local anaesthetic are used in this type of case, there is always danger of sloughing of the terminal part of the wound or toe, due to interference of the blood supply and to the ever-present infection. There is also grave danger of localized infection at the site of injection, because of the infected lymphatic drainage channels. The anaesthetic of choice is gas-oxygen.

In 2,255 new cases coming to the Surgical Outdoor of the Royal Victoria Hospital in 1933 for treatments of all kinds, there were 22 of ingrowing toe-nails, grouped as follows: 8 belonged to Class 1; 9 to Class 2; and 5 to Class 3. Eradication of the nail and nail-bed with skin-grafting was done in all five of Class 3, with good results, except in one in which the removal of the nail-bed was not done thoroughly enough; subsequently from the remnant a hard little spur developed, which was removed. One patient who had this operation done returned to his duty as traffic officer in three weeks, and has been "carrying on" during the intervening three years without discomfort.

The procedure described above is for ambulatory cases attending the surgical outdoor. The method of skin-grafting and after treatment can be modified considerably for indoor patients, with lessened attendant risk to the skin-grafts.

The chief advantages of the procedure recommended in severe ingrowing toe-nails are: (1) shortened convalescence; (2) less pain; (3) a pliable scar; (4) less tendency to give trouble after healing is completed.



## Case Reports

### A CASE OF CHRONIC THORACIC EMPYEMA TREATED WITH MAGGOTS

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The observation of Ambroise Paré (1509-1590) that neglected wounds containing maggots healed remarkably well has been confirmed many times since. It was William S. Baer,<sup>1</sup> of Baltimore, who put these historical observations into actual practice by the deliberate introduction of the larvæ of the blow-fly into the open wounds of chronic osteomyelitis. Following the publication of his work in 1931, Dr. Dudley Ross, Surgeon of the Children's Memorial Hospital, Montreal, began to use these maggots in a similar fashion, obtaining the blow-flies from Baer.<sup>1</sup> The fly after being hatched produces eggs in four to seven days; the eggs hatch in four to twenty-four hours, the larvæ turn into pupæ in five to seven days and the adult flies emerge in seven to ten days. These flies were fed and housed according to Baer's procedure and the eggs sterilized after his method.

#### CASE REPORT

(No. 80732). E.B., a male, aged 60 years, was admitted to the Royal Victoria Hospital on March 7, 1932. The history showed that he had had a former admission in October, 1930, with acute empyema on the right side, which had been drained by rib resection, and he had been discharged in December of the same year with a healed wound. The diagnosis of right basal bronchiectasis had been made at the same time, but no treatment for this underlying condition was suggested, on account of the patient's age. On discharge the sputum was about six ounces a day. Following discharge he was fairly well, apart from occasional pain in the right chest, but in March, 1932, complained of a very severe pain over the old scar and the clinical examination confirmed by thoracentesis disclosed a recurrence of the empyema. Five hundred c.c. of foul greyish-green thick pus was aspirated. Bacterio-

logical examination showed streptococci and slender Gram-negative bacilli, large numbers of fusiform bacilli, but no spirochætes or tubercle bacilli. The dark field showed no spirochætes. Cultures gave a streptococcus; no growth on anaerobic culture. On March 9th a partial Schede operation was done, with resection of five inches each of the eighth and ninth ribs from



FIG. 1.—Wound with wire cage surrounding.

their angle forward, and excision of very thick fibrotic partially calcified costal pleura. The empyema pocket ran up underneath the seventh rib, but the upper limit could be reached with the finger upwards and forward to the anterior axillary line. The capacity was 500 c.c., measured with saline. A dry dressing was applied. Histological examination of the pleura showed no evidence of tuberculosis. March 10th, dressing changed; the discharge was very foul.

March 18th, no chemicals having been introduced into the wound since the operation, but, it being merely washed out with saline, a test tube-ful of maggots, kindly given me by Dr. Ross, was put into the wound, the edges being bound with adhesive and a screen put over the top. An electric light was suspended near the screen, with the object of driving the maggots into the depths of the wound.

March 19th, the discharge was much more profuse, but much thinner also; the maggots were lively. March 21st, the maggots were still active, but less so. They seemed larger and appeared to be nearing the end of their life cycle. The discharge was less and thinner, not so foul. March 22nd, maggots dead; the dis-

charge was now quite thin; healthy pink granulation tissue was seen covering the lung. Culture—streptococci persisting. Direct smear showed a few streptococci, staphylococci, a Gram-positive micrococcus, but no fusiforms. March 24th, more maggots applied. March 28th, discharge was now negligible and granulation tissue extensive in formation. The whole wound looked very clean, pink and healthy. March 30th, maggots dead; washed out with saline. The capacity of the cavity was 100 c.c. April 5th, the patient was up; April 19th discharged; wound practically healed; the cavity was filled in with granulation tissue, with the exception of the skin edge separation. The patient was completely unaware of the nature of his treatment.

This case was followed for two and a half years, with no recurrence of the empyema.

#### COMMENT

The noteworthy thing was the extremely rapid formation of granulation tissue and the rapid reduction in the size of the empyema cavity, not produced exclusively by expansion of the lung. It is believed that this is the first case to be reported in the literature of the use of maggots in chronic recurrent empyema.

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### A CASE OF OSTEITIS TUBERCULOSA MULTIPLEX CYSTICA

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Van Alstyne and Gowen<sup>1</sup> have reported a case of a peculiar condition of bone known as "multiple cystic tuberculous osteitis". These authors have reviewed the literature on the subject, and, quoting from Jungling, who was the first to study and draw attention to the condition, note the following characteristic features of the disease. (1) The onset is gradual; pain may be present early, but is not severe. (2) There is marked cystic degeneration of the bone which is readily demonstrable by roentgenographic examination. (3) There is a tendency for the small cysts to fuse, forming larger cysts. (4) There is a lack of involvement of the periosteum

and joints. (5) There may be a lupoid involvement of the skin in the affected area. (6) The histological picture shows epithelioid and lymphocytic cells, rarely giant cells, no caseation, and no tubercle bacilli. (7) Guinea-pig inoculation is frequently negative for tuberculosis and, when positive, is slow, requiring several months. (8) The von Pirquet test is usually negative. (9) The course of the disease is usually slow, with a definite tendency toward spontaneous improvement and even recovery.

In addition, the above authors draw attention to the frequent association of lupus pernio and Boeck's sarcoid with multiple cystic tuberculous osteitis. They also point out that it is very rare to find the condition in any other except the small long bones of the hands and feet. It is to be noted that the term "cystic" refers properly only to the type of erosion seen in the roentgenogram. The "cysts" are filled with tuberculous granulation tissue.

The following case of multiple cystic tuberculous osteitis is being reported, not only because of the comparative rarity of the disease but because this particular instance shows involvement of a joint cavity. So far as can be judged from the review of the literature by Van Alstyne and Gowen, this is only the second such case to be reported. The diagnosis in this case was suggested by an article on multiple cystic tuberculous osteitis by Sanes and Smith.<sup>2</sup>

#### CASE REPORT

The patient was a Chinese male, an electrician, aged 35 years. In January, 1930, he developed pulmonary tuberculosis. In June of the same year he was admitted to Leahi Home for treatment. The x-ray showed a moderately large cavity of ragged outline in the right upper lobe. The sputum was positive for acid-fast bacilli. Under artificial pneumothorax the cavity ultimately disappeared and the sputum became negative. He was discharged, the disease apparently arrested, in November, 1932.

In July, 1932, the patient noted slight aching pain in the left great toe in the region of the metatarso-phalangeal joint. Examination of the toe revealed nothing abnormal, and an x-ray of the toe, taken July 13, 1932, was read as apparently normal (Fig. 1). At no time was the pain serious enough to give rise to much discomfort. He left hospital four months after

first noting the slight discomfort. At this time there was no disability on walking and no increase in discomfort. About October, 1933, (fifteen months from the onset) he noted a slight puffiness and dusky redness over the joint above mentioned. The discomfort was still very slight. From this time on a gradually increasing hypermotility of the joint developed. In the early part of February, 1934, (nineteen months from the onset) he became concerned about his condition and consulted the medical staff at Leahi Home. An x-ray examination was advised, and the resulting plate showed extensive cystic erosion and a moth-eaten appearance of the adjacent ends of the metatarsal and first phalanx of the left great toe (Fig. 2). At this time, examination revealed the following. The left great toe in the region of the metatarso-phalangeal joint was of a cyanotic hue and slightly swollen. This swelling seemed to be fluctuating but was not tense. It gave the distinct impression of containing fluid. The affected toe was distinctly warmer to palpation than the right great toe. There was marked hypermotility of the joint, and crepitus could be elicited by pushing the phalanx up against the metatarsal. A remarkable feature of the condition was that manipulation of the joint and rough elicitation of crepitus gave rise to practically no pain. There was no associated lymphadenitis. The patient was quite able to walk on the affected foot with little discomfort or disability. He presented no physical signs or x-ray evidence of activation of his healed pulmonary tuberculosis. The Wassermann test was negative. The blood count showed 7,500 leucocytes per c.mm. with a normal differential count. The temperature rarely rose to 99 degrees, and the general condition was excellent.

A diagnosis of cystic degeneration, etiology unknown, was made. The condition of multiple cystic tuberculous osteitis was unknown to us. Considered in the differential diagnosis were: (1) An unusual form of tuberculosis, (2) benign giant-cell tumour, (3) syphilis, (4) leprosy, and (5) atrophic joint. The last three of the above conditions were ruled out. The x-ray picture did not fit any (at the time) known form of tuberculosis, while it did resemble considerably the picture of benign giant-cell tumour. A tentative diagnosis of the

latter was made, in spite of the fact that the process involved two separate bones.

On March 10, 1934, Dr. A. L. Craig made a lateral incision over the affected joint under novocaine block anaesthesia. There was no free escape of pus or hæmorrhagic tissue from the wound or joint, a fact which made us feel less sure of a diagnosis of either tuberculosis or giant-cell tumour. With the curette, however, a considerable amount of necrotic bone and granulation tissue was removed from the articular ends of the bones. There was practically no bleeding. The wound and joint were packed with iodoform gauze, and the incision loosely closed with a few stitches. There was no subsequent discharge from the wound, and the packing and stitches were removed in a few days. The wound rapidly healed and closed completely without any post-operative pain.

Microscopic sections and acid-fast smears were made of the granulomatous tissue re-

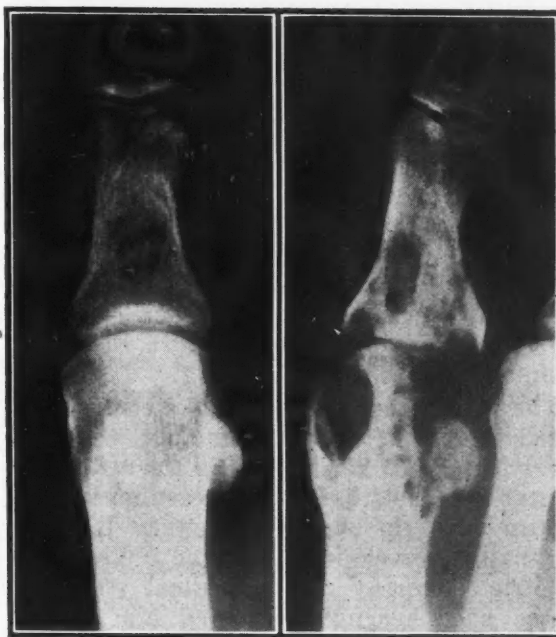


FIG. 1. — Roentgenogram of toe, taken July 13, 1932, when patient first noted discomfort.

FIG. 2. — Roentgenogram of toe, taken February 21, 1934, nineteen months after first complaint of discomfort.

moved at operation. No acid-fast organisms were found in the smears, but a rare bacillus was found in microscopic sections stained for acid-fasts. The histological sections showed granulation tissue with immature tubercles and a few giant cells. A guinea pig inoculated with material from the bones died exactly one month following inoculation with a small abscess in the groin at the site of puncture and slight



enlargement of the regional lymph glands. The abscess was found to contain cheesy material and many acid-fast bacilli. Organisms from the guinea pig were planted on culture media and a growth of acid-fast bacilli was obtained in 24 days. Thus the question of etiology was definitely settled, and the condition is now regarded as being a case of multiple cystic tuberculous osteitis. The x-ray picture (Fig. 2) shows an advanced stage of the condition, the primary individual cysts having run together and broken into the joint. If an earlier plate had been obtained no doubt several small separate cysts would have been visualized.

The case presented resembles other reported cases in the insidious onset, the remarkable absence of even moderate pain, the peculiar cystic degeneration on x-ray examination, the histological picture, the slow course of the disease, and the occurrence in the small bones of the foot.

The case presents the following noteworthy features: (1) involvement of a joint; (2) absence of lupoid or sarcoid changes in the skin; (3) the patient had a positive Mantoux reaction, as compared with the usually negative von Pirquet of previously reported cases; (4) a definite history and evidence of previous pulmonary tuberculosis; (5) demonstration of tubercle bacilli in the tissues; and (6) rapidity of death of the guinea pig following inoculation (one month as compared with several months in other reported cases).

*Treatment.*—At the present time the patient is wearing a plaster cast which extends from just below the knee to the toes.

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## Clinical and Laboratory Notes

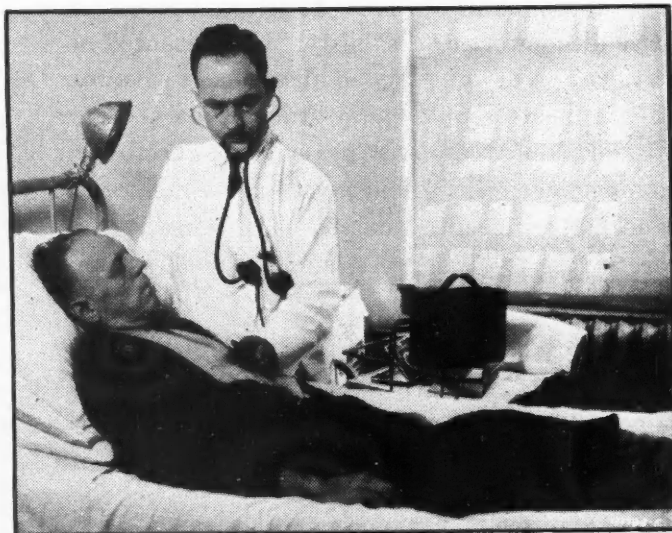
### AN ELECTRICAL STETHOSCOPE

A small device which enables a physician to magnify the sound of the human heart 100 times and to "tune in" on heart sounds he wishes to hear has been placed in experimental use recently, according to an announcement from the News Bureau of the Northern Electric Company in Montreal.

The device is an electrical stethoscope based on the telephone principle, with a heart instead of a voice doing the talking. It is so compact that its two vacuum tubes are each but the size of a peanut. It was originally developed by the Western Electric Company for a medical student whose poor hearing prevented him from using the ordinary stethoscope. Its success in aiding this student aroused interest among physicians having the same handicap and also among those who make examinations in noisy places. In addition, it was found that the tuning device assists in difficult diagnoses by emphasizing faint heart sounds which may be especially significant.

The entire stethoscope weighs less than a full brief case and is about half the size. A pick-up device, which works magnetically like the ear piece of a telephone in reverse, is laid against the chest and picks up the vibrations of the chest wall caused by the action of the heart. Most heart tones are relatively low in the scale

of sound and the pick-up device is designed to transmit these low tones most efficiently. These sounds are electrically transmitted over a short telephone cord to a tiny amplifier weighing 4 ounces, and about one-fourth as large as those used in the best radio receiving sets. The



amplifier contains the two "peanut" tubes, 1½ inches high and ½ inch in diameter, and two miniature transformers with cores of permalloy, a special metal alloy which produces high magnetism from extremely small electrical voltages. This amplifier multiplies the original power 100 times, employing only 4 flashlight

cells for the filaments of the two tubes, and 2 of the smallest size dry batteries for their plates. This current is delivered to a telephone receiver which reproduces the heart action in the form of greatly magnified sound. A physician may hold the receiver directly to his ear, or he may attach to it the tube of his own stethoscope and thus listen in the usual manner.

"Tuning in" on certain heart sounds is done through an electrical filter. The thumping of the heart is its loudest sound and also its deepest, the tones lying mostly below 100 cycles in the sound scale. The "blowing" and "whistling" of the heart, which in certain ail-

ments may be the more significant, are much fainter and are also higher in pitch, being from 200 to 1200 cycles. By throwing a switch the physician causes the filter to cut down on the low thumping tones and thus tunes in clearly on the heart's higher notes.

A single switch turns the stethoscope on and off and another controls its volume. By plugging in extra receivers, as many as three persons can listen at the same time. The portable stethoscope is a miniature companion to the large hospital type of electrical stethoscope which has been in use for some time and through which an entire auditorium of medical students can listen simultaneously.

## Editorial

### A CANCER CAMPAIGN FOR CANADA

ALL classes of the community will be interested in the suggestion of His Excellency the Governor-General that Canada commemorate the twenty-fifth anniversary of the accession to the Throne of His Majesty the King by establishing a fund for the relief of cancer. His Majesty, with that solicitude for the welfare of his people which has characterized him throughout his long reign has graciously approved of the proposal and that the fund be known as the King George the Fifth Silver Jubilee Fund for the Relief of Cancer in Canada. No more worthy memorial of a beloved Sovereign and a momentous reign could well be conceived of. All will agree that the need is urgent and the cause is good. There should be little difficulty, therefore, in raising the necessary money. But success will depend upon more than good will; upon more than money. It calls for the stimulation of interest, careful planning, the cooperation of all classes, and vigorous action.

In any discussion of the cancer problem at this date it is impossible to avoid the re-statement of platitudes and self-evident truths—and yet how necessary are they! If any campaign looking to the relief of cancer is to be of lasting value it must be based on one primary consideration—education—education of the laity and education of the medical profession. The facts about cancer must be put before the laity in a simple but effective way. People must be told of the

danger attending the presence of sores that will not heal and lumps that will not disappear; they must be advised as to the desirability, indeed, the necessity, of consulting competent medical authority *early* in such cases; they must be told of the danger of trusting to quacks and quack remedies; they must be told of the virtues of periodic health examinations. The doctors attached to large hospitals and clinics no doubt are well posted in the early signs and symptoms of cancer, but those practising in smaller communities, those who see only one or two cases of cancer in a year, may need to refresh their memories. It is imperative that they can recognize the first indications of this dread condition and advise appropriate treatment without delay. Indeed, more than this is required. All medical men should endeavour to ensure that the necessary treatment is obtained *immediately*. Both medical men and the laity must become more "cancer-conscious". There is no place here for the "pooh-pooh-er"!

In the matter of education the doctor can do much. If he needs education himself he can attend some cancer clinic in a large centre. Those with more experience can address medical societies and write articles. All can stimulate interest among the laity by talking to their patients, by addressing service clubs, church societies, university students, and other groups. In short, the medical men can stimulate interest in cancer

and the Cancer Campaign in a hundred ways. They will, naturally, themselves aid this great project by cooperation to the utmost of their ability.

Next in order comes the establishment of clinics for the diagnosis and treatment of cancer and the institution of centres for research. Here it is that team work is essential. Physician, surgeon, pathologist, radiologist, physicist, and chemist should collaborate.

It is also essential that some uniform system for the recording of case histories, clinical features, and the results of treatment be adopted, so that the statistics obtained may be reliable and comparable.

We, in Canada, have undoubtedly been slow in taking up the cancer question as a problem demanding concerted action. Yet this thought has been simmering in our minds for years. It is true that some of our Provinces have already established Cancer Clinics which are doing excellent work, but we have been waiting for the establishment of some broad scheme, on cooperative lines. At last, this dream bids fair to become a reality.

The Canadian Medical Association has not been unmindful of its responsibility in this matter and has had the subject of cancer control under advisement for some years. The stimulus came from the West. In 1930 the Saskatchewan Medical Association memorialized the national body to take up the Cancer Problem, and, accordingly, a Study Committee on Cancer was formed, under the chairmanship of our present President. This committee, which represented all parts of Canada, went thoroughly into the matter and brought in a report which was both helpful and inspiring, and cleared the way for further effort. When this particular committee was discharged a new one was formed, under the chairmanship of Dr. Alexander Primrose, to bring in a concrete proposition. A progress report of this committee can be found in this issue of the *Journal* (page 318). It will be seen that a Cancer Campaign for Canada is recommended, and a comprehensive scheme for dealing with the cancer problem is outlined. The report was adopted and the Association now stands committed to the principle of a Cancer Campaign for Canada, somewhat on

the lines of the British Empire Cancer Campaign. All that remained was to choose a suitable time to launch the effort. The psychological moment has now arrived, and we, as an Association, rejoice that the initiative has come from a source so eminent as at once to command the attention of the intelligent public and ensure success. As a national body, representing organized Medicine from coast to coast, our Association is prepared to take its full share in promoting the welfare of the project. The scheme starts auspiciously, and already a Board of Trustees has been selected, in whom the people will have confidence, to administer the funds that will be collected. The personnel is as follows:—the Chief Justice of Canada, the Premier, the Leader of the Opposition, the Minister of Pensions and National Health, the Chairman of the Canadian Medical Association's Committee for the Study of Cancer, the Chairman of the Public Health Committee of the Canadian Life Insurance Officers' Association, and the Dean of the Faculty of Medicine of the University of Montreal. The Deputy Minister of Pensions and National Health will act as Honorary Secretary. The inclusion on this Board of Trustees of the Chairman of the Association's Study Committee on Cancer ensures a useful bond of union between the lay and medical components of our community. We hope it means that our Association will be recognized as the body competent to give proper technical assistance.

The Canadian Medical Association is certainly in a position to give helpful leadership in connection with the purely scientific aspects of the Campaign, and, indeed, can give valuable aid in other ways, in promoting publicity and exciting interest. It is prepared to pull its full weight in the boat.

There are several reasons why our Association is specially qualified to do this service. It has the knowledge; it contains in its membership those who are recognized authorities on the subject of cancer; it has already outlined a plan of campaign; its sphere of influence is the whole of Canada. In its *Journal*, its Health Education Department, its Hospital Service Department, and its Post-graduate Courses it has facilities which ensure that it can do a magnificent job for Canada. We pledge our full cooperation.

A. G. N.



## CARCINOGENIC SUBSTANCES

THE high incidence of epithelioma in workers exposed to frequent contact with gas-works' tar, shale oil, and certain lubricating oils has long been recognized, and when Yamagiwa, in 1915, produced similar malignant growths by patient and prolonged painting of the ears of rabbits with tar, a new line of experimental attack on the problems of cancer was opened. It was soon shown by Tsutsui that the mouse (unlike the rat) was a still more suitable object for such investigations. The tar, or tar extract, is usually applied with a paintbrush, twice a week, to a selected area on the dorsal surface; the hair, which at first hypertrophies, eventually falls out and does not reappear, and at this time (about seven weeks) the skin is found to be thickened and infiltrated with lymphocytes. After some fourteen weeks of treatment, wart-like prominences of the squamous epithelium (benign papillomata) may be found on the smooth hairless surface. If the application of tar is stopped, the papillomata may gradually disappear, or they may persist unchanged, growing very slowly for an indefinite period; but eventually, after a very variable lapse of time, one or two of them

dentally or experimentally by frequent exposure to x-rays; and also of the gastric carcinoma produced in rats, in Fibiger's well-known experiments, by infestation with the worm *Spiroptera*. On the other hand, in the case of the fowl tumours of the Rous' sarcoma type, which (unlike mammalian tumours, with one rather doubtful exception,<sup>2</sup>) can be transmitted by cell-free filtrates, the situation is very different; the injected tumour-filtrate gives rise to an active malignant growth as rapidly as a transplant of living tumour cells would. It is a rather puzzling fact that the tumours which can be produced in fowls by the subcutaneous injection of tar also yield cell-free Berkefeld filtrates capable of inducing rapid growth of a fibrosarcoma in other fowls.<sup>3</sup>

In a brilliant series of investigations, Cook and his collaborators<sup>4</sup> succeeded in isolating from the complex mixture of substances in gas-works' pitch the pure substance 1,2-benzopyrene (Fig. 1), the most potent carcinogenic agent yet discovered, and this led them to the difficult synthesis of a series of similar compounds, some of which like 1, 2, 5, 6-dibenzanthracene (Fig. 2) were highly active, while others of similar constitution were

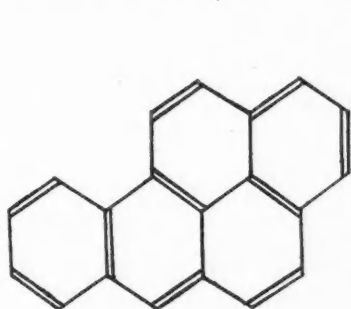


FIG. 1

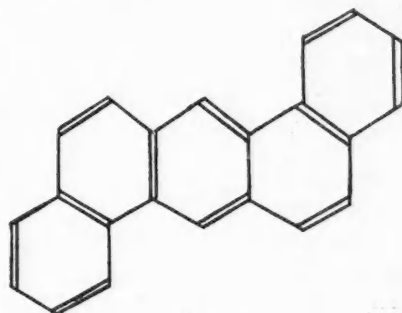


FIG. 2

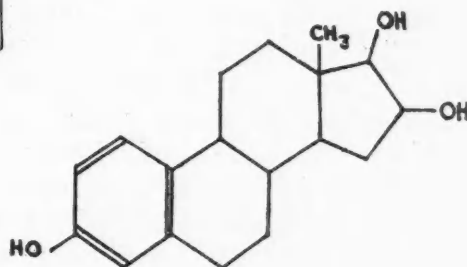


FIG. 3

will begin to grow rapidly, becoming malignant and invading the skin and underlying tissues, and giving rise to metastases in the lymph nodes and elsewhere, causing the death of the animal<sup>1</sup>, possibly a year or more after the experiment was begun.

This extremely slow induction of the malignant state is characteristic also of the epitheliomata that may be produced acci-

apparently inert. The separation of these pure substances made possible new developments in experimental pathology, such as the production of connective-tissue tumours by the injection of the carcinogenic agent,

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3. MCINTOSH, J.: On nature of tumours induced in fowls by injections of tar, *Brit. J. Exp. Path.*, 1933, 14: 422.

4. COOK, J. W., HEWETT, C. L. AND HIEGER, I.: Isolation of the cancer-producing hydrocarbon from coal tar, *J. Chem. Soc.*, 1933, p. 395.

subcutaneously or intraperitoneally, in rats, mice and fowls<sup>5</sup>.

Since this line of work is commonly related to Virchow's "chronic irritation" theory of the origin of cancer, it may be well to point out that the carcinogenic substances are not irritants in the ordinary sense, and do not provoke inflammatory reactions when applied to the skin. Phenol, again, is irritating but not carcinogenic; and the most powerful known irritant, mustard gas, is said actually to inhibit the production of tar cancers! On the other hand, the complex condensed-ring hydrocarbons of the type discussed are more reactive chemically than the simple aromatic hydrocarbons like benzene and naphthalene from which they are derived; for instance, they readily undergo oxidation when exposed to light, and these oxidation products are apparently capable of altering the enzyme systems of the living cell<sup>6</sup> in a manner which may possibly throw some light on the peculiar metabolism of tumour tissue, with its relative independence of any oxygen supply. Speculation along these lines is limited, however, by the fact that chemical reactivity and carcinogenic potency do not run parallel in the series of compounds prepared by Cook and his co-workers.

There is, on the other hand, a still more fascinating, and, doubtless, still more dangerous, line of speculation suggested by the identification of the structure of the carcinogenic substances. Recent work has revealed the presence in a surprisingly large number of natural substances, of very diverse physiological properties, of a system of four rings condensed together in a manner suggesting the condensed aromatic rings of the cancer-producing hydrocarbons. This system of four fused rings, with various attached side chains, or with alcoholic and other groups introduced into the ring system, is to be found, for example, in cholesterol and other sterols including vitamin D; in cholic acid and other bile acids; in the digitalis and strophanthus glucosides, and in the related cardiac poisons formed by certain

toads; in the testicular hormone (andosterone), the corpus luteum hormone (progesterin), and the oestrus-producing ovarian follicular hormone (oestrin) produced in large quantities by the placenta during pregnancy.

The system of four rings that occurs in all these plant and animal products differs in at least one important respect from the condensed ring systems of the carcinogenic hydrocarbons. In the latter the six-membered rings are all of the aromatic or benzene type, containing three double bonds in each ring; whereas the six-membered rings of the natural products listed above do not contain more than two double bonds, and indeed are for the most part completely saturated. This very greatly influences and distinguishes the chemical properties of the two groups of substances, and little support could be found for a suggestion that the animal body could convert an almost saturated substance like cholesterol into a wholly aromatic phenanthrene derivative with carcinogenic potentialities.

An intermediate case is provided, however, by the group of substances comprised under the name "oestrin". The two members of this group present in the blood and urine in pregnancy, oestrone (theelin) and oestriol (Fig. 3), possess one aromatic ring; and two such rings are found in a related substance from the urine of pregnant mares (equilenine). The oestrin series may thus be regarded as bridging the gap between the saturated and the purely aromatic substances, and such a view is justified by the discovery<sup>7</sup> that the characteristic physiological response to oestrin (production of oestrus in ovariectomized rats and mice) can be evoked by the administration in rather large doses of a wholly aromatic and carcinogenic substance such as 1, 2-benzpyrene, on the one hand, or, on the other hand, of a substance such as ergosterol without one aromatic ring. A suspicion that the oestrins may not be altogether innocent of carcinogenic properties is therefore not unreasonable.

Attempts to produce malignant growths by external application of oestrin prepara-

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tions have so far been unsuccessful. The fact that œstrin administration may evoke "spontaneous" mammary carcinoma in male mice of a strain in which the females are susceptible<sup>8</sup> does not in itself vouch for a direct carcinogenic effect of œstrin. However, several workers<sup>9,10,11</sup> have observed metaplasia from columnar to squamous

stratified epithelium in the seminal vesicles of male mice and rats treated with œstrin; and a similar metaplasia of the uterine epithelium has recently been produced in ovariectomized rats by prolonged treatment with œstrin intra-peritoneally, or, more rapidly, by introducing solutions of œstrone in corn oil directly into the lumen of the uterus<sup>12</sup>. That this hormone has some degree of direct carcinogenic action under suitable conditions is therefore extremely probable, but it would at present be rash to conclude that this action has ever been effectively exerted, except in the experiments described.

DAVID LANDBOROUGH THOMSON.

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## Editorial Comments

### Drainage in Acute Appendicitis

Dr. Cayford's paper, appearing in this number (p. 259), upon a review of the cases of acute appendicitis admitted to the wards of the Montreal General Hospital in the three years 1931 to 1933 is a praiseworthy contribution to a subject which is of perennial interest and has called forth a specially large volume of literature in the last decade. Unfortunately, a good deal of confusion still persists, particularly in respect of the results as to mortality. It seems to be a fact that the general mortality following the operation for appendicitis has definitely increased during the last 10 or 15 years, and it is a widely-held opinion that this increase is in great part due to the rise of the rural or small town hospital and the general assumption on the part of insufficiently trained doctors that the appendicitis operation is an easy one, which very frequently it is not. But even among trained surgeons there is still much diversity of opinion concerning the relative merits of the types of operation, treatment of the appendix abscess, the appropriate time for intervention in the acute case, and the use of drains, besides many other points. Dr. Cayford's article contributes something definite to these problems, as representing the general surgical opinion of a large university hospital. But even so one cannot help regretting that an article involving so much time and labour should still leave the average surgeon in some doubt concerning moot questions.

Practically all articles based on a large series of cases suffer from one great disability, that of classification, because those who write are not as yet agreed upon a universal classification.

Acute appendicitis, as interpreted by Dr. Cayford, includes such widely different pathological conditions as the sub-acute catarrhal form (of the old clinical manifestation), diagnosed only by a trifling congestion and by the microscopical report and, at the other extreme, a perforative gangrenous appendicitis with general peritonitis. It is true that his division into three groups is distinctly valuable, but group B and group C overlap, one should imagine, a great deal, and one misses any separate group for perforation with generalized peritonitis.

Perhaps the most valuable part of Dr. Cayford's paper lies in the demonstration that drainage can much more often be omitted than is generally thought. And yet here, too, the experienced surgeon fears to proclaim overmuch the advantages of omitting drainage. In the writer's opinion drainage should be employed whenever the pathological condition present indicates that a necrotic slough will remain behind, and such drainage should be kept up until nature has extruded as pus such slough, until ultimately disintegrated. As Dr. Cayford says, each case is a special problem and there can be no specialization of procedure. Nevertheless, articles of this nature are of definite value in that they contribute to building a foundation of general principles upon which action in any one case can better be determined. One must, in conclusion, congratulate the surgical department of the Montreal General Hospital upon being able to present such excellent figures in regard to the period of disability and the mortality rate, both of which are unusually low.

E.W.A.



### Strychnine Poisoning in Children

The article by Drs. Ross and Brown in this issue of the *Journal*, reporting cases of strychnine poisoning in children, chiefly due to A.B.S. and C. tablets, calls attention to one of the defects in our legislation in regard to poisons. The list of substances defined as poisons differs in each Province, and no list is the same as that of the schedule of the Patent or Proprietary Medicines Act of the Dominion. A brand of A.B.S. and C. tablets containing two poisons (strychnine and atropine), both of which are on the schedule of this Dominion Act, has been licensed under the Patent or Proprietary Medicine Act. This makes possible their sale by any grocer or other vendor who knows nothing of poisons. The Canadian Pharmaceutical Association has protested in the interest of the public health, with no effect. If such dangerous remedies are to be licensed, surely the further suggestion made by this Association and supported by the Canadian Medical Association is wise. This suggestion was that any licensed remedy which contained a scheduled drug should be marked "Poison". A milder caution, such as "dangerous to children" is not enough. The warning must be emphatic. Such remedies as A.B.S. and C. tablets should only be sold on a physician's order. Our profession is in part to blame for their present mode of sale. We have considered them, like many other things, such as cinchopen and amidopyrine, harmless, and with less justification than in the case of these two. Home medication for the occasionally constipated can be met by salts. The habitually constipated requires medical study directed to his permanent relief. He has too frequently failed to get it and has become the easy victim of the drug vendor.

### Lewis Stephen Pilcher

Dr. Lewis Stephen Pilcher, scholar and editor for half a century of the oldest surgical journal in the United States, the *Annals of Surgery*, died on December 24, 1934, aged eighty-nine. Country school teacher, country practitioner, naval surgeon, student of tropical disease, anatomist, professor of surgery, editor, bibliophile, patriot—these nouns indicate a few of his many interests and activities over a long and intensely useful life.

Lewis Stephen Pilcher entered the University of Michigan at the age of thirteen, and took his bachelor's degree at seventeen, the youngest matriculant and the youngest graduate of that great institution. His master's degree was added within a year, and in that same year he entered upon medical study. This was in 1863 when the Civil War was raging. The next year found him with enough medical knowledge to volunteer as a hospital steward and throw himself into the thick of service among the sick

and wounded. Then back to the University of Michigan and the doctor's degree in 1866. Many years later, 1900, this institution conferred upon him the honorary degree of Doctor of Laws. Practice began in a rural district of Michigan at the age of twenty; at the same time, to guarantee a livelihood, teaching in the little schoolhouse by the blacksmith shop. He rode his horse across the countryside to the call of the sick, followed the current literature of medicine, and for diversion read the classics in their original Greek and Latin.

The next move was to an internship in a Detroit hospital. Then came a post-graduate course in the hospitals of New York City, and then his successful examination and appointment as Assistant Surgeon in the United States Navy, in 1867. His marriage, retirement from the navy, and entrance into private practice, in 1872, all spelled romance and adventure. Then came the years of practice. But Pilcher wanted something more. He organized a dissecting room in his house. This expanded into an adjacent building. A museum and library grew up in connection with it. He dissected also at the Long Island College, and became Adjunct Professor of Anatomy, in 1879, and Surgeon to the Dispensary. In 1885 he was appointed Professor of Surgery at the New York Post-Graduate Medical School.

In 1884 he became editor of the *Annals of Surgery*, a position which he occupied to the time of his death. This publication, beginning in 1884, was acquired in 1897 by the J. B. Lippincott Company. The editorial policy and censorship of advertising have never been relinquished by the editor. If we add to the fifty years of the *Annals of Surgery*, the seven years of the *Annals of Anatomy and Surgery*, and its predecessor which he inspired and dominated, this period of medical editorship establishes him as the dean of medical editors in the United States, if not in the world.

The *Annals of Surgery* will be continued under an able Editorial Board, of which Dr. James Taft Pilcher is Managing Editor.

A.G.N.

### The Meeting of the British Medical Association in Melbourne

As already noted in these columns, the British Medical Association will hold its 103rd Annual Meeting in the City of Melbourne, Australia. Only three times has the Association met outside of England, and on each occasion in Canada—in 1897 in Montreal, in 1906 in Toronto, and in 1930 in Winnipeg. The president for the Melbourne Meeting is Sir Richard Stawell, Consulting Physician to the Melbourne Hospital. The date is September 11th, 12th, and 13th. Members travelling to Australia through Canada will sail for Mont-

real from Liverpool on July 26th or from Glasgow on July 27th. Those going via the United States will sail for New York from Southampton on July 27th. It is intended that the two parties will join forces at San Francisco for the last leg of the course to Australia. Details of the itineraries will be published in this *Journal* later. It is confidently expected that our Association will be officially represented at the gathering, and it is hoped that

many of our members will seize this opportunity to secure a delightful trip and a great scientific experience under particularly favourable circumstances. The itineraries planned are of exceptional interest and a warm welcome is promised by our Australian brethren. While the distance is great the reward is also great.

The Honorary Local Secretary for the Meeting is Dr. J. P. Major, Medical Society Hall, East Melbourne, Victoria, Australia. A.G.N.

## Medical Economics

### A PROPOSED SCHEME OF HEALTH INSURANCE FOR MANITOBA\*

By J. C. McMILLAN, M.D., F.R.C.P.

As a medical organization, as physicians, licensed and registered to practise in the Province of Manitoba, what is our main objective? Is it not to provide a complete and efficient medical service for the people of this province?

"Service to the public" has always been the motto of the medical profession.

Unfortunately, in order to discharge our obligations as private citizens we must have reasonable compensation for our services. Under the present system that compensation is received from our patients who are able to pay and according to their ability to pay.

Every doctor's practice is made up of two classes. Those who can pay for services rendered and those who cannot. So long as the first class is sufficiently numerous and the second class not too numerous, we are able to function and give an adequate service to all. Should the first class decrease and the second class increase, there will come a time when the system breaks down. We might well ask ourselves the question: "Are we not now approaching or have we not even reached the breaking point?"

It is granted that many of the economic difficulties which are being experienced by the members of our profession are merely those shared by every other person in the community. On the other hand, I believe that the present depression has served to reveal many inherent weaknesses in our present system of supplying medical services. Many of those who have made a serious study of these problems have concluded that our present system is so defective that some new method of supplying medical services must be evolved to satisfy the demands of the public.

In the past, when any change was proposed or even mentioned we have thrown up our hands in holy horror and shouted "State Medicine". So we have been inactive. While it is true that during the past few years we have thought a lot and talked a lot about these problems, and have even gathered some fairly accurate statistics, the fact remains that as an organized medical body we have done practically nothing.

But while we have been inactive, the public have not. They have not only been thinking, but have been acting. And what has happened? Our governments have been forced to assume more and more financial responsibility for the medical care of our people. At the present time our governing bodies are directly responsible for the medical care of about 150,000 people in this province. That is, one-fifth of our population. But the most important development, so far as we are concerned, is the municipal doctor. While in Manitoba we have only 5 of these, in Saskatchewan I am informed there are 107. That is to say, over one-third of the rural parts of Saskatchewan have actually adopted the worst type of state medicine. All this has happened while we have stood by and insisted we must not have state medicine. In my judgment, the time has come, gentlemen, when we must decide if it is safe for us to continue our policy of watchful waiting and run the risk of having some new system forced upon us by outside agencies, or are we going to attempt to work out some new plan of our own for rendering medical services to the public.

In England and other European countries, plans of health insurance have been in operation for many years. In many cases these plans were thrust upon an unprepared medical profession by politicians and had many defects. But these defects have been gradually eradicated, until at the present time the main criticism by the medical profession is that they are not sufficiently comprehensive. That is, they provide only a limited medical service for certain classes of the people.

In Canada much has been written on the sub-

\* Presidential Address, Manitoba Medical Association Annual Meeting, Winnipeg, Manitoba, September 10, 11, 12, 1934.



ject, but no plan has actually been set up\* or tried out, so we have nothing really to go by, and any plan that may be adopted will have to fulfil the needs of the particular province involved and the details worked out from information and data available. In this connection I would like to quote from a recent article by H. H. Wolfenden, entitled "Insurance and Public Health", in which he says: "Insufficient allowance is often made for the fact—so well known to actuaries—that it is almost entirely useless to rely on estimates from European data, or statistics of Workmen's Compensation Boards, or mere 'sickness surveys', without very careful actuarial adjustments for the special and often wholly different characteristics of the portion of the Canadian population for which the estimates are required. Moreover, it is dangerous to ignore the effects of the gradual aging of our population, for, especially in the West, our age distribution is still that of a young community which in future years will mature with a consequent large increase in total costs for incapacity and illness."

But, notwithstanding our lack of knowledge and experience of this subject, I believe that we are capable of setting up some plan of health or sickness insurance that would provide an efficient medical and hospital service for all the people of this province.

In my opinion, any plan to be successful should embody the following principles:

1. Free choice of doctor by the patient.
2. Payment to doctors for services rendered.
3. It must include a complete medical and hospital service.
4. It must include every person in the province.
5. The relation between the different branches of the profession must not be disturbed.
6. The administration of the plan must be under a Board or Commission, non-political, but must have a governmental connection through the Department of Public Health.
7. The medical profession must have the major part in the management.
8. It must be a compulsory contributory plan of taxation on a true insurance basis.
9. Medical and hospital service to be supplied only within the province.
10. Provisions must be made for our Medical School.

I consider a medical school an important means of maintaining a high type of medical

service. A medical service must be the same for the poor as for the rich. An ulcer in a poor man's stomach takes just as much care in diagnosis and requires exactly the same treatment as if it were in the stomach of a rich man. But this does not hold for hospital accommodation. The plan that I have in mind would provide an efficient hospital service, probably as we know the present public ward service. If better accommodation than this is desired, the limit will be the patient's ability to pay for extras.

While insutncient data in Manitoba are available, yet certain figures can be obtained from the Department of Health and Public Welfare with regard to the cost of hospitalization. For the year 1933 we find that the average per capita cost for operating our hospitals was \$3.00. We have also some information as to the cost of supplying medical care apart from hospitalization, through the Unemployment Relief Commission. We find that the average per capita cost per year for the type of medical service that is being rendered to the unemployed in Greater Winnipeg is \$2.25. Of course, this is only a partial medical service, and is being given at cost or below cost, so that a complete medical service at a reasonable schedule of fees would be much more.

We are going to suggest for the purpose of this paper, the figure of \$6.00 per person per year for the whole population of the province, for supplying a complete medical service. That is, a total of \$9.00 per person per year for a complete medical and hospital service. If we take the population of Manitoba as 700,000, this would mean a grand total of \$6,300,000. But there are a number of people in our province who are at present wards of governments, and who probably always will remain as such, so we think an even \$6,000,000 would finance the proposed scheme.

The people of Manitoba can be divided into two main groups for taxation purposes. The first group are those who make their living off the land, that is bona fide farmers and their dependents, comprising some 250,000 people. The remainder are subject to the present 2 per cent wage tax.

Now, how are we going to obtain the \$6,000,000 required? We know that at present there are certain sums contributed by the State, mainly for hospitalization purposes, and these funds could be allowed for the scheme. As near as we can estimate, the cost to the City of Winnipeg for this purpose is at least \$500,000 per year. The cost to the other municipalities of the province is at least \$300,000 per year. The cost to the Provincial Government is at least \$400,000 per year. And the Workmen's Compensation Board, which obtains funds from industry, paid out last year for medical care and hos-

\* No doubt when this address was delivered the President of the Manitoba Medical Association had not seen the Report of our Committee on Medical Economics which appeared in the Supplement to the September issue of the *Journal*.—Ed.



pitalization at least \$130,000. In a normal year I should judge this would be at least \$150,000. This makes a total of \$1,350,000, leaving a balance of \$4,650,000 to be raised from the people.

If the proceeds from the present wage tax could be set aside for this purpose and increased to 3 per cent instead of 2, it would bring approximately \$3,000,000, leaving a balance of \$1,650,000 to be raised from the farming community. It has been suggested that two methods may be employed for raising this amount. First, a definite mill rate on equalized assessment on the farming property of the province, or, secondly, a definite amount per acre to be collected through the ordinary taxes. The first method, I think, is preferable. A rate of six mills on equalized assessment on all farming lands would realize the sum of approximately \$2,000,000. In those municipalities which are at present employing a municipal doctor the assessment is about two mills. For this the people are receiving only a partial medical service, and no hospitalization.

Now, to sum up our figures, we have already \$1,350,000 that is already been paid for medical care and hospitalization by the different governing bodies and other organizations. A 3 per cent wage tax would give us approximately \$3,000,000, and a 6 mill assessment on farm lands would give us another \$2,000,000, making in all \$6,350,000, for administration costs and a sinking fund.

The administration of any such plan should not be complicated, and the medical profession should have a strong representation on any Board or Commission. One might think that there would be great opportunity for abuses, both by the medical men and the people, but on the whole I believe that people, including the medical profession, are essentially honest. This has been borne out in the operation of the medical relief scheme now in force in Greater Winnipeg, and I am sure that you will all agree with me that our Compensation Board is operating efficiently and so far as we are concerned is giving complete satisfaction.

The many advantages of such a scheme

should be apparent to all. In the first place, probably the greatest advantage would be that those requiring medical care and hospitalization would be sure to get it, and the people would pay for this service while they were well and able to work, and a severe illness would not be the financial catastrophe that it is at the present time. In the second place, all our governing bodies would be relieved of the enormous expense for medical care of indigent persons. I also believe that the actual cost for hospitalization could be greatly reduced from what it is at the present time. Also, the centralization of administration would greatly reduce administrative costs. The hospitals would be in a much better position because they would be paid for all accommodation supplied. This scheme does not make provision for capital outlay to hospitals, but we think that this might be taken care of by extra payment received for accommodation over and above that which would be allotted under this scheme. Lastly, the benefit to the medical profession needs little comment, but two points might be mentioned. The physician would be relieved of the necessity of making any financial arrangement with his patient, which is so often irritating and unsatisfactory, and he would have the free use of his fellow practitioners in a consulting capacity, and be able to give a much more satisfactory medical service than he does at present.

Some of you may think that the figures quoted are too low to provide a complete medical and hospital service, but we have used them as a means of setting up the financial framework of a scheme that might be feasible. At this point I would like to suggest to the incoming Executive that this problem be turned over to the Committee on Sociology for their intensive study during the coming year.

We have assumed in the foregoing to suggest the framework of a scheme for the supplying of a medical and hospital service, that I feel would meet the needs of all the people of Manitoba.

In conclusion, I wish to thank the members of the Committee on Sociology and the Department of Health and Public Welfare for the assistance they have given me in preparing this address.

**ARGYRÆMIA.**—Blumberg and Carey describe a case of argyræmia, in which despite the peculiar pallor, there was no obvious brown, blue, gray or black pigmentation other than gingival lines and non-specific dental discoloration. The patient was not exposed to strong light during the period of silver treatment. The spectrograph demonstrated marked argyræmia, or high blood silver, which resulted from the oral administration of silver nitrate for gastro-intestinal symptoms. The blood silver was estimated spectrographically to be 0.05 mg. per hundred cubic centimetres; in normal blood, silver appears as a faint trace, or is absent, *i.e.*, to an amount less than 0.0005 mg. per hundred cubic centimetres. The persistence of the high blood silver for more than three months after exposure indicated a heavy deposition of silver in the tissues. Abnormally high silver was also

detected in the urine, faeces, cerebrospinal fluid, skin, dental tartar and probably saliva. The presence of the metal in the urine and faeces demonstrated that silver was being partially eliminated from the body. Only faint traces of silver were present in the blood and urine in definitely pigmented cases of argyria ten years or more after exposure; this showed the eventual departure of appreciable silver from the circulation. The spectrographic determination of silver in the blood, skin, and other parts of the body is an aid in diagnosing obscure argyria and in differentiating it from lead or bismuth intoxication. The authors suggest the spectrographic determination of blood silver as a method of guarding against argyria in silver therapy and sound a warning note on the danger of internal silver therapy.—*J. Am. M. Ass.*, 1934, 103: 1521.

## Men and Books

## SATIRA MEDICA

(Continued)

BY E. P. SCARLETT, M.B., F.R.C.P.(C.),

Calgary

## THE EIGHTEENTH CENTURY

The mood of eighteenth century satire is the acceptance of the tolerability of life. Voltaire, the voice of the age, in "Vision de Babouc" relates that Iturial, the guardian genius of the earth, having received Babouc's report concerning affairs in the world, "resolved to allow the world to go its way, for," said he, "if all is not well, it is all tolerable." There was still a good deal of controversy among medical men, but the issues were largely artificial. Quackery continued to flourish; indeed the century is probably the age par excellence of medical humbugs. But the ordinary physician of the day had become fashionable and strove for and aped social eminence. More often than not this cultivation of the social graces interfered with practice, and, as one sly critic writes, "The apparent inattention with which practitioners exercise their calling is sometimes of incalculable value to the patient. Nature frequently takes advantage of their negligence to exert all her own efforts in effecting a cure." In Hogarth and his literary friends of the period there are rather malicious pictures of the fashionable physician—his costume, sword, ample and indispensable wig, his urbanity, erudition, and his chariot. Fielding in 1732 writes—"A physician can no more prescribe without a full wig than without a fee". It was against medical gentlemen of these tendencies that the downright John Hunter waged open war.

The rough wit of Smollett satirized the ignorance and the coarseness of the physician, his aping of fine dress and manners, and the time-honoured tricks to attract practice of riding about town and being called out of church. The novels of Smollett, who practised as a physician none too successfully, may be regarded as the forerunners of the medico-literary novels of our own day. In "Tristram Shandy" Sterne shrewdly draws the family doctor of the period in the person of the immortal Dr. Slop, "the scientific operator", large-bellied and squat of figure, who delivers Mrs. Shandy and brings Tristram into the world after much excitement.

The great medical event of the century was the introduction of the practice of vaccination for smallpox. Jenner published his paper in

1798 and it provoked a flood of caricature and satire. Most of the caricatures presented individuals sprouting horns and showing bovine characteristics following vaccination.

A Canadian criticism of the practice of inoculation for smallpox, which was in vogue before Jenner's discovery, appeared in 1765 in the *Quebec Gazette*, written in French by a wag of the time, and is illustrative of the reaction, probably not without some justification, of a considerable number of the population to the new method of inoculation.

"La Gazette de Québec, Thurs., July 11, 1765. Letter written this year from the other world by a citizen of this town, who died as a result of inoculation, to Messrs. the Printers of Quebec in Canada.

Gentlemen,

Charon's boat being ready to leave for the other world, I was informed too late to have the time before my precipitated departure to make you the recital of a peculiar adventure which happened to me in your country during my unfortunate sojourn there, in order to give proper notice of same to the public. I loved desperately an amiable young lady who returned my love; as we were on the point of being united together by conjugal ties, she wished in spite of my loving objections to be inoculated; wishing to follow the same lot as she, I had someone do the same thing to me. The most beautiful hopes were favouring us at the beginning; but all of a sudden through misfortune and events which men cannot foresee, the Fates cut the thread of our days, and the tomb terminated our love. Having arrived at the same time at the Elysian Fields we tasted perfect happiness; but as the Faculty of Medicine were holding pre-nuptial celebrations which were presided over by the famous Doctors Hippocrates and Æsculapius, assisted by other modern doctors, such as Silva and Dumoulin, having learned the object of our sojourn, invited us to assist at their learned discourses, in order to prove that the new method of the physicians and surgeons of your country of treating the small-pox patients, and of making inoculation or insertion of small-pox to others who have not got it, is contrary to the ancient laws of the Faculty of Medicine; that they should before doing such operation, and before giving any remedies, know perfectly the temperaments, the quality of the blood and of the humours of the different persons, and adopt the most favourable time for making the insertion. That is the reason the Elysian Fields are filled with inoculated small-pox victims; and never before so many as during the past year. This is why I thought it proper to profit by the occasion of this Celestial Messenger to inform you of the above, in order that in the future wise measures should be taken concerning this subject, always having at heart the interest of my co-citizens and most particularly others of your town.

I remain, Gentlemen,

The most humble soul,

"The Inoculated".

"At the Elysian Fields,  
July 1st, 1765."

Medicine is the subject of rough comedy in a play "The Devil upon Two Sticks" which appeared in 1768. The author, Samuel Foote, himself took the part of the Devil, alias Dr. Hercules



Hellebore, President of the College, who conducts an examination for License, approves the radical cure for toothache, extraction, a vomit and purge for pain in the bowels, and extirpation for corns. The license grants to the licentiate "full power, permission and license to pill, bolus, lotion, potion, draught, dose, drench, purge, bleed, blister, clister, cup, scarify, syringe, salivate, couch, flux, sweat, diet, dilute, tap, plaister and poultice all persons, in all diseases, of all ages, conditions, and sexes," and contains a charge to "all mayors, justices, aldermen, sheriffs, bailiffs, head boroughs, constables, and coroners not to molest or interfere with the said doctor if any person whom he shall so pill, bolus, lotion, potion, draught, dose, drench, purge, bleed, blister, clister, cup, scarify, syringe, salivate, couch, flux, sweat, diet, dilute, tap, plaister and poultice should happen to die, but to deem that the said party died a natural death, anything to the contrary notwithstanding". His lecture is interrupted by the entry of Mr. Forceps from the hospital, wanting to know what the president wanted to have done to the patients there. He, learning that the previous day the attendants had "bled the west ward and jalloped the north", said, "Did ye? Why, then, bleed the north ward and jallop the west today."

Some other satirical barbs of this century are the following:

"The doctors, tender of their Fame,  
Wisely on me lay all the blame."

—Dean Swift.

"Physicians think they do a lot for a patient when they give his disease a name."—Kant.

"Who are the greatest deceivers? The doctors.  
And the greatest fools? The patients."—Voltaire.

#### THE NINETEENTH CENTURY

The steady progress of scientific medicine which was in full flood by the middle of the nineteenth century, together with the far-reaching social and industrial movements of the age, changed the whole world of medicine and created a type of physician who had little in common with his brother of the eighteenth century. Through a dissolving mist of frock coats, white spats, atrocious Latin, and studied benevolence, the new practitioner gradually appeared whose mind and person bore the stamp of modern science. At the same time medical satire underwent a profound change. During the early years of the century the old satire prevailed—ridicule of the foibles of the ignorant or the fashionable practitioner. About 1870 in art and literature the doctor became a sentimental figure—Fildes's picture "The Doctor" and Maclaren's book "The Bonnie Brier Bush" are typical of the time. For the first time in history

public opinion became respectful and even sympathetic toward the medical practitioner. What satire was written became increasingly impersonal, concerned not so much with the infirmities of the individual as with the limitations of the craft as a whole. Unquestionably, the best picture of the early Victorian physician is to be found in the pages of George Eliot's "Middlemarch", in the person of Philip Lydgate. The attitude of the gentry, so-called, toward the doctor is expressed in the words of Lady Chettam, in discussing Lydgate's superior family connections—"One does not expect it in a practitioner of that kind. For my own part, I like a medical man more on a footing with my servants; they are often all the cleverer. I assure you I found poor Hick's judgment un-failing; I never knew him wrong. He was coarse and butcherlike, but he knew my constitution." The medical setting in a small hamlet is superbly satirized by George Eliot in "Scenes of Clerical Life" in describing the two local medical men, Mr. Pilgrim and Mr. Pratt.

"Mr. Pratt elegantly referred all diseases to debility, and, with a proper contempt for symptomatic treatment, went to the root of the matter with port-wine and bark; Pilgrim was persuaded that the evil principle in the human system was plethora, and he made war against it with cupping, blistering and cathartics. They had both been long established in Milby, and as each had a sufficient practice, there was no very malignant rivalry between them; on the contrary, they had that sort of friendly contempt for each other which is always conducive to a good understanding between professional men; and when any new surgeon attempted, in an ill advised hour, to settle himself in the town, it was strikingly demonstrated how slight and trivial are theoretic differences compared with the broad basis of common human feeling. There was the most perfect unanimity between Pratt and Pilgrim in the determination to drive away the obnoxious and too probably unqualified intruder as soon as possible. Whether the first wonderful cure he effected was on a patient of Pratt's or of Pilgrim's, one was as ready as the other to pull the interloper by the nose, and both alike directed their remarkable powers of conversation towards making the town too hot for him. But by their respective patients these two distinguished men were pitted against each other with great virulence. Mrs. Lowme could not conceal her amazement that Mrs. Phipps should trust her life in the hands of Pratt, who let her feed herself up to that degree, it was really shocking to hear how short her breath was; and Mrs. Phipps had no patience with Mrs. Lowme, living, as she did, on tea and broth, and looking as yellow as any crow-flower, and yet letting Pilgrim bleed and blister her and give her lowering medicine till her clothes hung on her like a scarecrow's. On the whole, perhaps, Mr. Pilgrim's reputation was at the higher pitch, and when any lady under Mr. Pratt's care was doing ill, she was half disposed to think that a little more 'active treatment' might suit her better. But without very definite provocation no one would take so serious a step as to part with the family doctor, for in those remote days, there were few varieties of human hatred more formidable than the medical."

The new note of intelligent criticism begins to modify the strictures of satire in such verses as the following:



"Says Nature to Physic, what pity that we,  
Who ought to be friends, should so seldom agree.  
With medical legions my humours they chase,  
Till pallid resentment appears in my face;  
Aperients, astringents, narcotics combine  
To thwart and oppose me in every design;  
And by volleys of pills discharg'd at my head,  
My strength is exhausted, my energy dead.  
But Physic should know that I am not to be taught  
By severe flagellation to do what I ought;  
That my faults may be mended by gentle correction  
To which science and talents must give the direction."

—*Nature and Physic—Professional  
Anecdotes, 1825.*

The increasing tolerance and humour of the satire is apparent in two doggerel rhymes accompanying caricature plates of 1825 and 1827.

"Those worthy Esculapian dangles  
Men's constitutions' dear entanglers;  
Whose bushy wigs do first sustain  
Great practice, backed by aug'ral cane.  
With waste of purse, you may ensure  
For galloping consumption — cure;  
By feeling pulse, they will explain  
The source of pulmonary pain;  
And while right hand embraces wrist,  
Behind back glides the other fist;  
Ready to grasp those dear definers  
Of Wisdom — pretty yellow shiners:

Our modern men of this same calling  
Lay consciences beneath tarpauling;  
For with all ills they do their best,  
And if they do wrong, soul's at rest.  
So whether men live or die,  
In each case there's equality,  
Gaining one way health's restoration,  
By t'other, soul's emancipation — !"

The other rhyme:

"Death saw a patient who pulled out his purse,  
And a doctor who took the sum.  
But he let them be, for he knew the 'Fee'  
Was a prelude to 'Faw' and 'Fum'."

The poets of the century have very little to say about the physicians. Matthew Arnold goes to the heart of one situation in medical practice in this stanza—

"Nor bring to see me cease to live  
Some doctor full of phrase and fame,  
To shake his sapient head and give  
The ill he cannot cure a name."

Tennyson, in the poem "In the Children's Hospital", expresses the reaction to the growing impersonal nature of medicine and surgery—

"Our doctor had called in another, I never had seen him  
before,  
But he sent a chill to my heart when I saw him come  
in at the door,  
Fresh from the surgery schools of France and of other  
lands —  
Harsh red hair, big voice, big chest, big merciless  
hands."

Dickens and Thackeray, the great satirists of the age, dealt kindly, on the whole, with the doctors. Thackeray nearly always has a friendly feeling for the physician. A score or more of practitioners wander through the pages of Dickens, absent-minded, pompous, sometimes ridiculous, usually busy, and rarely very efficient. The fashionable physician attends Mr. Murdle; the fussy, rather important, physi-

cian looks after the family cares of the Chuzzlewits; Mr. Lumbey, the hard-working obstetrician, who finds no time to shave, is on hand for the growing family of the Kenwigs; the medical note of authority echoes in the resounding names of Dr. Bayham Badger and of Dr. Parker Peps; Dr. Slammer in "Pickwick" and Dr. Jobling in "Martin Chuzzlewit" are cut in the model of fashionable smartness. The energetic pair of student "sawbones" in "Pickwick", Bob Sawyer and Ben Allen, are pictorially vivid of the propensities of medical students for hard drinking. Altogether rather an ineffectual lot — going about with creaking boots and ticking watches and pompous frock-coats, a bit bewildered, but usually carrying it off somehow or another.

#### THE MODERN PERIOD

The medical satire of today bears as little resemblance to that of previous days as does the matter-of-fact business attire of the modern physician to the periwig and breeches of his eighteenth century prototype. The effect of modern science in its social implications has been to change the emphasis of criticism entirely and to scrutinize the system of medical practice rather than the all-too-human practitioner. Further, in the literature of today satire is less a species than a spiced ingredient. The modern arena is too large and the point of view necessarily swings through too wide an orbit to permit the intense concentration which is required of good or even effective satire.

Any survey of modern satire dealing with medicine must begin with the figure of Samuel Butler, who, though a Victorian, was a modern born out of season. In a stubborn refusal to sentimentalize he attacked everything from Christianity to Victorian drawing-room manners. In "Erewhon" he satirized medicine, but passes much of his satire along to the patients whose attitude and demands are responsible for many of the weaknesses in the medical scheme of things. Butler is the spiritual father of George Bernard Shaw, the keenest satirist of modern medicine. Shaw's ideas are best set forth in the preface to his play "The Doctor's Dilemma", in which he attacks the medical system rather than doctors as individuals. He points out that the shortcomings of the individual physician are in the main due to the anachronisms of the system. This preface is a shrewd analysis of the basic difficulties experienced by every physician in practice, and suggests the voice of some medical Jacob behind the hands of the writing Esau. Indeed Shaw's position has been distorted and unfairly criticized by his medical critics, who have allowed the Shavian fancies in regard to vivisection and vaccination to blind them to his real merits as a commentator on the essential stupidity of many medical customs. Making allowance for Shaw's love of overstatement, which is apt to revolt the scientific mind, the

physician will find in this preface the most able statement which has yet appeared of the problems of medical practice under modern social conditions, with the gradual encroachment of business and democracy upon the prerogatives and traditions of medicine. I quote at random from this preface.

"It is not the fault of our doctors that the medical choice of the community, as at present provided for, is a murderous absurdity."

"The distinction between a quack doctor and a qualified one is mainly that only the qualified one is authorized to sign death certificates, for which both sorts seem to have about equal occasion."

By making doctors virtually tradesmen, he points out, we compel them to learn the tricks of the trade. Consequently we find that the fashions of the year include treatments, operations and particular drugs as well as hats, sleeves, ballads and games. "I do not share that hostility to the doctor as a man which exists and is growing as an inevitable result of the present condition of medical practice". The shortcomings of the physician "arise out of the doctor's position as a competitive private tradesman: that is, out of his poverty and dependence".

"I would make it compulsory for a doctor using a brass plate to have inscribed on it, in addition to the letters indicating his qualifications, the words, 'Remember that I too am mortal!'"

And has the substance of the ethical and social problem in the practice of medicine ever been more clearly stated than in these words?

"The real woes of the doctor are the shabby coat, the wolf at the door, the tyranny of ignorant patients, the work-day of twenty-four hours, and the uselessness of honestly prescribing what most of the patients really need: that is, not medicine, but money."

Cupidity is a very human vice, and its effect in the medical ranks is described by Osler in his usual vivid phrases. "There are Gehazis among us who serve for shekels, whose ears hear only the lowing of the oxen and the jingling of the guineas."

Psycho-analysis in its infant state, and still regarded by many as the doubtful child of medical psychology, has been an easy butt for ridicule and satire. One verse, in its excellent brevity, neatly hits off one of the tendencies of the psychiatrist.

"A PSYCHO-ANALYST"

"Omniscient in your juggler's booth  
All is discovered through your patter  
Except the simple, obvious truth  
Of what was actually the matter."

The physician and his work have become a favourite theme of the modern novel. For the most part writers are preoccupied with the hard work, the rivalries, and the daily "grind" of the profession, or the scientific paraphernalia which they exhibit to a generation avid for scientific signs and wonders. At a time when the satirical tide is running strong in fiction, very little satire has reached the

doctors. And, achievement triumphant!—one physician has been admitted to the hierarchy of detective fiction in the person of the masterly Dr. Thorndyke, the creation of Mr. Austin Freeman.

*Punch*, which, in keeping with a great tradition, continues to mirror week after week the whole human comedy, mildly and pleasantly pokes fun at doctor and patient alike. There is, however, only the kindest satire in its commentary on medicine. One example will serve to illustrate its flavour. Two women are discussing the new doctor who has just come to the district. One says to the other, "Is he a pooh-pooh-er or a wind-up-er?"

EPILOGUE

We have chronicled in this paper the small beer of medical history, at times of a strange flavour, and, perhaps, on the whole a bit tedious. Today the issue has gone far and beyond tilting at the polite windmills of medical arrogance, dress, or complacency—amusing and entertaining, but when all was over no one was hurt. The mannered satire of the past has given way to the unreasoning demands of a restless democracy for the birthright of medicine. With the mob below and "the intellectuals" above, the profession of medicine is being subjected to the pressure of political materialism. In the excesses of our modern lunacy the safeguards of the liberal professions are being destroyed. Men refuse liberty to the spirit and the mind. They demand a uniformity and a subservience to new standards. The war showed the modern world the possibilities of regimenting the public mind. It is now proposed to regiment the professions, and in particular the ancient profession of medicine. Have done with the old sophisticated weapons of satire and irony; use the direct weapons of force and mass appeal! And this at a time when the adventuring of the mind in medical science is in full flood.

In this anthology we have sounded the depths of medical turpitude. They are as nothing to the anarchy which must result if the pillars and shrines of medicine are overthrown in the blind instinctive attempt to alter medicine in deference to the standards and demands of the mob. The physicians, whom this satire and invective of centuries have tempered and made wise, must hold to their course; their creed, that which H. M. Tomlinson has urged upon the literary men of our time—"Only the bold and skilful use of the best knowledge, and an austere regard in solitude for the honour of a tradition". And meanwhile the great majority of physicians will go quietly about their business, for,

"Without these cannot a city be inhabited:  
And they shall not dwell where they will, nor go up  
and down,---  
But they will maintain the state of the world,  
And their desire is in the work of their craft."

## Association Notes

### The Joint Meeting of the American and Canadian Medical Associations, Atlantic City, June 10 to 14, 1935

The Canadian plans for the conjoint meeting are developing satisfactorily. The Council of the Association will convene in Haddon Hall Hotel on Monday and Tuesday, June 10th and 11th. At the Monday luncheon, Dr. J. S. McEachern, our President, will present his valedictory address and install his successor, Dr. J. C. Meakins, of Montreal. It is expected that officers and members of the Board of Trustees of the American Medical Association will be guests at this function.

On Tuesday evening, the installation ceremonies of the joint convention will be held in the Auditorium, at which addresses will be given by Dr. James S. McLester of Birmingham, Ala., and Dr. J. C. Meakins of Montreal, Presidents-elect of the American Medical Association and the Canadian Medical Association, respectively.

General Sessions will be held on Monday and Tuesday, in which four representatives of Canada will take part. They are as follows:—

Dr. William Boyd, M.D., M.R.C.P.(Edin.), F.R.C.P.(Lond.), F.R.S.C., Professor of Pathology, University of Manitoba, Winnipeg.

Subject: "Growth, normal and abnormal".

Dr. Roscoe R. Graham, M.B., F.R.C.S.(C), Assistant Professor of Surgery, University of Toronto.

Subject: "The surgical contribution to the therapy of duodenal ulcer".

Dr. A. H. Gordon, M.D., C.M., F.R.C.P.(C.), Associate Professor of Medicine, McGill University, Montreal.

Subject: "Bone changes in certain medical diseases".

Dr. H. B. Atlee, M.D., C.M., F.R.C.S.(Edin.), F.R.C.S.(C), Professor of Obstetrics and Gynecology, Dalhousie University Halifax.

Subject: "Arguments in favour of a more active puerperium based on a study of 600 cases".

During the remainder of the week, the convention will be divided up into eighteen sections, officered by representatives from both Associations. The Canadian officers are as follows: *President*, Dr. J. S. McEachern, Calgary; *President-elect*, Dr. J. C. Meakins, Montreal; *General Secretary*, Dr. T. C. Routley, Toronto; *Chairman of Council*, Dr. Geo. S. Young, Toronto; *Chairman, Central Program Committee*, Dr. A. Primrose, Toronto.

The names of the Sectional Officers can be found on page viii of the February issue of the *Journal*.

At the time of writing, the Canadian contributions to the program are reported as coming in splendidly and represent the profession from coast to coast.

Chalfonte-Haddon Hall, one of the finest hostelrys on the American Continent, has been chosen as Canadian Headquarters. The hotel rates are as indicated hereunder, and reservations should be made direct:—

European Plan—room and bath—one person, per day, \$3, \$4, \$6, \$8; two persons, per day, \$5, \$6, \$8, \$10.

The daily rate for three meals on the American Plan is \$3.00.

Single meals on the European Plan are as follows: breakfast, \$1.00; luncheon, \$1.50; dinner, \$2.00.

Further particulars with regard to any phase of the meeting will be gladly supplied upon inquiry addressed to Dr. T. C. Routley, 184 College Street, Toronto, General Secretary of the Canadian Medical Association.

### Proceedings of the Executive Committee, Ottawa, October 30, 1934

(Continued)

#### REPORT OF THE STUDY COMMITTEE ON CANCER

Dr. Primrose presented the following progress report of the Study Committee on Cancer, of which he is the Chairman:

A year ago, this Executive Committee asked Dr. Bazin to nominate a Committee to deal with the problem of Cancer. Dr. Bazin suggested myself as Chairman, Dr. W. B. Hendry, Dr. H. Wookey, Dr. N. S. Shenstone, and Dr. Duncan Graham. As things developed, I took the liberty of asking others to join the Committee, namely, Dr. Geo. S. Young, Dr. J. C. Fitzgerald, Dr. G. E. Richards, and Dr. T. C. Routley.

The Committee met last week and made the following recommendations to this Executive Committee:

1. That the Executive Committee establish a Department of Cancer Control in the Canadian Medical Association.
2. That the present Study Committee on Cancer be given power to add to its personnel other members, both lay and medical.
3. That the Department so constituted take steps at once to organize and direct a Cancer Campaign in Canada along similar lines to those followed by the British Empire Cancer Campaign.
4. That the Department be given power to collect funds and appoint a permanent Secretary as soon as possible.
5. That the Department work in cooperation with the British Empire Cancer Campaign, not necessarily in affiliation.
6. That the work of the Department include the following activities:
  1. The securing of funds.
  2. The propagation of knowledge concerning cancer and the methods of attacking it.
  3. The establishment of a library on cancer.



4. The making of grants to aid cancer study and research.

(With regard to No. 1, "The securing of funds", it is suggested that the Committee secure a guaranteed sum of \$25,000 which should be placed at the disposal of the Department to cover initiation and the first two years' expenses; and that some plan of raising funds be put into operation immediately, for subsequent expenses.)

In the opinion of the Study Committee an Executive Committee should be formed, with Chairman, Vice-Chairman, Secretary, and other personnel, and there should also be committees such as the following:—

- A Scientific Advisory Committee;
- An Investigation Committee;
- A Radiology Committee;
- An Appeal Committee;
- A Finance Committee.

It was suggested that the Secretary should propagate information concerning the principal lines of attack in operation the world over in the fight against cancer. The following points were outlined:

- (a) The attack against the cancer cell and the chemical reactions that occur within it.
- (b) Cancer-producing substances—petroleum in various forms, the hormone "œstrin", etc.
- (c) Facts regarding anti-cancer serum.
- (d) Hereditary factors in cancer.
- (e) Chemical substances which destroy the cancer cell without being harmful to the normal cell, e.g., lead salts.
- (f) Cobra venom.
- (g) Biochemical investigation—in particular the metabolism of carbohydrates as sources of energy. The biochemical results of radiation on the living cells.
- (h) Immunity.
- (i) Grading of malignant tumours.
- (j) The cancer-producing properties of commercial lubricating oils.
- (k) The serum test for cancer.
- (l) Radium—proper dose and legitimate field for employment. The bomb.
- X-rays.

It is proposed that a cancer library should be established, of circulating type, made available to all parts of Canada, and under the control of the Secretary. This should contain periodical literature and other books or articles bearing on cancer.

There should be a national appeal for funds. The Committee suggested that, for the first two years of operation, we would require \$25,000—\$12,000 for each year; but additional funds must be collected to provide for the later period. It was also suggested that the capital sum subscribed should be sufficient to provide funds for research in various directions.

Regarding the Secretary, it is necessary that he be a medical man with special qualifications. It would be necessary for him to prepare pamphlets and booklets from time to time for distribution to the medical profession and the general public. It is suggested that the headquarters for the present be at the office of the General Secretary in Toronto; and that, as time goes on, the organization be enlarged to include Committees in the various provinces of Canada and also in the larger cities.

As the Prince of Wales is the Patron of the Canadian Medical Association, it has been suggested that we ask him to allow his signature to be attached to a special letter to be used in our appeal to the public for funds. In addition to the appeal to the public, we would be at liberty to approach prominent persons and perhaps Governments,—Federal, Provincial, and Municipal.

After some discussion, referring particularly to the matter of early diagnosis, Dr. Primrose agreed to add the following to the second item:—

"All other activities which, in the opinion of the Committee, would be valuable in the control of cancer in Canada."

The report as amended was then approved.

*Carried.*

It was pointed out that our membership is now confined absolutely to medical graduates; in fact, many of the scientific teachers in universities are not eligible for membership in the Canadian Medical Association. The opinion was expressed that it would be advisable for the Committee on Revision of By-laws to study the question of the possibility of having other than medical membership, on a restricted basis. This is important in connection with the future work of the Committee on Cancer because a large membership connected with the Department of Cancer Control would stimulate interest in many ways. The fee, of course, would be comparatively small.

The Study Committee was authorized, if need be, to establish something in the nature of a Grand Council, consisting of both lay and medical members, who would be of service in furthering the interests of the Department.

#### DEPARTMENT OF HOSPITAL SERVICE

In the absence of Dr. Agnew, the General Secretary presented the following interim report from the Department of Hospital Service,—

The work has grown to such an extent that arrangements are now being made whereby the hospital associations comprising the Canadian Hospital Council are raising funds to supplement the finances and staff now available under the Department of Hospital Service. This should give us one more girl and a fund which would permit printing of bulletins, reports, etc., to a greater extent than hitherto. These financial arrangements are not quite complete but satisfactory progress is being made.

The Group Hospitalization Committee has been preparing considerable data during the interval since the interim report submitted to Council at the Calgary meeting. Much additional information has been secured at recent hospital conventions throughout Canada and at one or two big national meetings across the line, and I am sure that we shall have a valuable report for the Atlantic City meeting.

Inasmuch as this study is to a large extent additional as well as judicial, and as included detail must be of necessity reasonably extensive, it would seem advisable that this report should be available in booklet form for distribution to hospital administrators, trustees and medical staffs through our Department of Hospital Service. This is of particular importance because those individuals who are most likely to start such a plan, such as superintendents and trustees, are not regular readers, if at all, of the *Canadian Medical Association Journal* and, therefore, because of what would appear to be the ultimate importance of this subject it would seem advisable to have these booklets made available in keeping with similar reports issued from time to time by our Department of Hospital Service. Of course, for inclusion in the reports to Council, it might be possible to make a much abridged synopsis or summary.

In order that we have some guidance in preparing and selecting the data for inclusion in this booklet I would be grateful for an expression of opinion from the Executive Committee as to the above proposal. This is a bulletin which might readily be paid for from the Department of Hospital Service funds.

As an evidence of international recognition, the Executive Committee might be interested in the fact that the superintendent of a hospital in Australia which is shortly to build a new institution has arranged a contest on this continent seeking suggestions for their new building—each contestant to submit "Ten Don'ts". In arranging this contest, Mr. George FitzPatrick, of the New South Wales Community Hospital, Sydney, Australia, asked that the following judges be named: Dr. M. T. MacEachern, American College of Surgeons; Dr. Harvey Agnew, Department of Hospital Service, Canadian Medical Association; Mr. Matthew O. Foley, Editor, *Hospital Management*, Chicago. This will not require a great deal of work but the opportunity of collecting the suggestions should prove of infinite benefit.

The Canadian Hospital Council has not as yet selected its biennial date which now falls in 1935, but from casual conversation with delegates and others from coast to coast one is of the opinion that the meeting will be held in all probability in Ottawa or Montreal, possibly next September. This body is working very closely with the various provincial governments and the Federal Department of Health.

The Executive will be interested in noting that the Minister of Health in British Columbia had a joint dinner with his Cabinet and the Executive of the British Columbia Hospitals' Association. At this meeting, a number of us had an opportunity of expressing a few comments, particularly from the hospital angle, and it would seem that a definite forward step has been taken towards ascertaining the hospital viewpoint *re* Health Insurance.

(Sgd.) G. HARVEY AGNEW

*Approved.*

## Hospital Service Department Notes

### Will there be a Permanent Shortage of Interns?

Every year there goes up the same call from so many of our hospitals throughout the country, "We are still short of our quota of interns. Where can we get them?" This shortage is felt most acutely among non-teaching hospitals and particularly those situated at a distance from the medical colleges. Of course, this shortage is nothing new; for many years a large proportion of our graduating classes, amounting sometimes to over 50 per cent of the individual class, went abroad, largely for internship in the United States.\* Then some three or four years ago, the American immigration authorities made it exceedingly difficult for visas to be obtained, and recent Canadian graduates found that they could not accept appointments being held for them across the line. For this short period Canadian hospitals had a surplus of applicants. Now the border is once more comparatively

\* See "The intern problem and our export of medical graduates" published in *Canad. M. Ass. J.*, 1929, 20: 61.

All communications intended for the Department of Hospital Service of the Canadian Medical Association should be addressed to Dr. Harvey Agnew, 184 College Street, Toronto.

open for bona fide post-graduate students, and the shortage of interns is again a problem, even though a larger percentage of our graduates are staying in Canada.

At the present time there are in Canada 513 internships in 39 hospitals "approved" and 50 internships in 13 hospitals "recommended" by the Department of Hospital Service of the Canadian Medical Association. "Recommended" internships are in hospitals which, although giving excellent opportunities for internship work, for one reason or another do not fully comply with the rigid requirements of the Basis of Approval for Internship. To meet this demand the total number of medical students graduated in Canada in 1934 was approximately 472; in 1933 the total was 479. Of this number a certain percentage would go to the United States for internships; another group proceeds to Great Britain, Paris or other post-graduate centres; and some proceed directly into practice. In some of our medical schools the internship year precedes graduation, but for purposes of comparison it would complicate the picture rather than simplify it to attempt to separate the two types of internships. Residencies and senior appointments, where possible, have been omitted in this comparison.

It is obvious from these data that there is a varying but consistent shortage of interns. True, a small number of American graduates come to Canada, for instance, to Vancouver, but this is more than offset by the fact that a number of our recent graduates are absorbed by Canadian hospitals not at present listed as approved or recommended. Moreover, it may be anticipated that this shortage will become more apparent as time goes on. As hospitals grow to meet the demand for more accommodation, as hospital technique becomes more complicated, demanding the increased attention of a resident doctor, as the vital importance of accurate and complete records becomes more obvious, as the value of the intern to the welfare of the patient is more widely recognized, it is apparent that more interns will be requested by our hospitals. At the same time we may anticipate a relative and probably actual decrease in the number of medical graduates.

How will this situation be met? Some hospitals, by virtue of their excellent internship facilities and the teaching provided, for many years may encounter little difficulty, but how about the many others, excellent though they be, which already have trouble completing their quota? It would seem logical to anticipate that such reorganization of the internship services would be imperative as would permit the supply to meet the demand. This could be effected in several ways: (1) by making a lengthier internship obligatory before receiving a license to practise; (2) by creating more



undergraduate internships and by developing clinical clerkships; and (3) by reducing and revamping the tasks assigned to the intern.

The first suggestion might be of some assistance, but, even though a credit for internship is not obligatory for practice in most provinces (as it is in many states to the south), very few medical graduates, unless driven by economic necessity, now go directly into practice without at least one year of general internship. However, if the increasing demand that specialists be required to take at least a minimum specified period of training materialize into legislation, a call for lengthier internships and residencies could be anticipated.

The second suggestion, the creation of more undergraduate internships and clinical clerkships, would be in accord with the desire of many medical teachers that more emphasis be laid upon bedside experience; however, this would be of assistance only to those hospitals which could be linked with medical colleges, and, for that matter, would be for the medical schools rather than for the hospitals to decide.

The third suggestion, the reduction and revamping of the tasks assigned to the intern, would seem to be an essential change of the future, irrespective of the development or not of the other plans. This may not be essential at the present time in most hospitals, but it would seem to loom up as a probability in the not too distant future. It is difficult to indicate any task now assigned to the intern in the average hospital the reassignment of which would not leave the intern the loser. Many hospitals now have all routine urinalyses and blood counts done by the laboratory technicians; this may be necessary on a busy service, but the intern is the loser. Ward dressings, intravenous treatments, operating room assistance, anaesthetics, are all part of the intern's experience, and as he is there, from his viewpoint, primarily for experience he would be loth to give up this work. Further, the outpatient and emergency services provide perhaps the features of his training most applicable to his after-life in practice.

But if the supply does not equal the demand some compromise must be made. It would seem possible in some services to have more of the dressings done by the nurses; blood withdrawals for laboratory purposes could be, and are being, done by technicians. The junior intern who assists at an operation by standing at the side table threading needles, or, perhaps, as second or third assistant, is assigned now and then to the distal end of a retractor, may be absorbing some of the operating-room atmosphere, but he would probably learn more of future value by devoting his time to other hospital activities, and his work in the operat-

ing theatre might be more adroitly done by a skilled nurse. Of course, more intimate assistantship in the operating field should be as freely available to the interns as the best interests of the patient will permit.

The matter of records will be of particular concern. The great majority of our public hospitals of over twenty-five beds capacity are now "standardized", a movement which has provided considerable stimulus to the keeping of better records of hospital patients. It would seem logical to predict a still greater development of hospital records as diagnostic procedures and diagnoses become more complex, and as payment for hospital care becomes more a concern of societies, boards, commissions or industries. The principle of accurate record-taking has been fully accepted by all administrators and boards, and to an ever-increasing extent by the members of the medical staff, particularly by the younger generation, who have served extensive apprenticeships in this work as interns.

Where interns are available, the histories, particularly on the public wards, are written by them. Where interns are not available, the histories on the whole tend to be brief. The most effective way of dealing with this latter situation would seem to be the provision of a good stenographer with triple plus personality whose task it would be to obtain the data from the doctor whenever occasion offers. The installation of dictaphones has been recommended; while these have been of real service in special departments their lasting value as history getters would seem still to be proved. As the ratio of available interns to hospital beds falls, the time may come when it would seem advisable, particularly in medium-sized hospitals without any, or, with insufficient, interns, to consider the training of a non-medical woman, preferably a nurse, to do much of this work. Naturally the physical findings, the diagnosis and the progress notes should be written or dictated by the doctor, but a great deal of the history, both family and personal, could be recorded by a bright records worker with special training in symptomatology and such other details as would be relevant for this work. After a few years of experience, such a person should be able to perform these, and perhaps other clinical tasks, as efficiently as the average novitiate intern, particularly with respect to detail. This delegation of clinical work to non-medical workers may not be an ideal arrangement and should not be practised if interns are available, but as our supply of interns is already falling short of the demand, it is timely that some thought be given to the future.



## Medical Societies

### The Calgary Medical Society

At a meeting of the Calgary Medical Society held at the Belcher (Military) Hospital on January 8, 1935, Dr. J. E. Palmer gave an interesting discourse on "Ureteral obstruction", illustrated by numerous roentgenograms of cases in his practice. Dr. G. E. Learmonth followed with an address on "The life of Sir Robert Jones, Bart."

A special meeting of the Calgary Medical Society was held on January 31, 1935, at which Dr. J. S. McEachern, President of the Canadian Medical Association, spoke about the plans for reorganization of this Association, while Dr. D. S. Macnab, President of the Alberta Medical Association told about the contemplated changes in the organization of the Alberta Medical Association.

The annual banquet of the Calgary Medical Society was held on February 5, 1935, at the Renfrew Club. Dr. A. H. Baker presided. The guest-speaker was Mr. E. A. Corbett, Director of Extension Courses, Alberta University. His address was on "Some birds I have met". Dr. H. K. Goff, President of the Edmonton Academy of Medicine represented this Society, while Dr. A. M. Palmer represented the Calgary Dental Society. A pleasing ceremony, was the bestowal of a life membership in the Calgary Medical Society on Dr. J. S. McEachern.

G. E. LEARMONTH

### The Madawaska Medical Society

The Madawaska Medical Society at its last meeting elected officers as follows: *President*, Dr. P. H. Laporte, Edmundston; *Vice-presidents*, Drs. C. J. Violette, St. Leonards, C. H. Turner, Edmundston; *Secretary*, Dr. J. B. Gaudreau, Edmundston.

### The Montreal Physiological Society

At a meeting of this Society held on January 21st, the following papers were presented (here given in abstract).

SOME RECENT ADVANCES IN THE PHYSIOLOGY OF LACTATION, by Thomas McKeown.—It is observed that the stimulus of suckling when applied to normally cyclic rats and mice leads invariably to the appearance of a condition closely resembling the pseudo-pregnancy produced by sterile mating. It is characterized by cessation of œstrus, by the appearance of functional corpora lutea in the ovary, by a pro-gestational condition of the uterus, and by the development of the mammary gland, and eventually its secretion. A striking difference between the two conditions is to be noted, for although the sequence of changes

brought about by sterile mating is the consequence of a single stimulus, the removal of the suckling stimulus at any time leads to the immediate cessation of the characteristic changes. Further, it is noted that if Cæsarean section is performed in the first part of pregnancy, œstrus does not appear immediately, but only at a time which would correspond to the termination of a pseudo-pregnancy produced by sterile mating. This suggests that the changes which occur in the ovary during the early part of pregnancy are the result of the stimulation of the cervix.

CONCERNING THE MECHANISM OF ACTION OF PITUITARY (POSTERIOR LOBE) EXTRACT UPON URINE SECRETION, by K. I. Melville.—The action of posterior lobe pituitary extract (postlobin-V) upon urine secretion has been tested out comparatively under variously altered conditions of salt and water metabolism in the unanæsthetized dog with a bladder fistula and in the dog under sodium-phenobarbital anæsthesia.

It is shown that the diuretic response is augmented as the organism is rich in salt, whether conditions of associated hydration or dehydration are present. The data suggest that the underlying mechanism of pituitary diuresis is an extra-renal mobilization of salts primarily, more particularly, sodium chloride. The data do not suffice to draw definite conclusions concerning the antidiuretic action, but suggest very strongly that this action is not fundamentally wrapped up with existing conditions of water or salt alteration *per se* in the organism.

### The Saint John Medical Society

At the regular meeting of the Saint John Medical Society held in the Admiral Beatty Hotel on January 29th, Dr. V. D. Davidson was the special speaker. He took as his topic "Tension and pressure", citing as examples in disease, glaucoma, back pressure on the kidney in prostatic disease, intracranial pressure, intrathoracic pressure, back pressure from an obstructed biliary system, and tension from a diseased appendix. He drew from these a series of conclusions as to the damage caused by pressure, and went on to advise that from this the lesson should be drawn that surgical handling of tissues should be of the utmost delicacy. This paper was a departure from the usual type present in our Society, and was described as being a cultural effort along the lines of surgical philosophy.

### The Toronto Biochemical Society

The Toronto Biochemical Society held its 33rd meeting in the School of Hygiene, the University of Toronto, on December 20th. The following communications were presented (given here in abstract).

OBSERVATIONS ON THE BRADYCARDIA METHOD FOR THE DETERMINATION OF VITAMIN B<sub>1</sub>, by A. D. Barbour and W. C. Henry.—The method of assay of vitamin B<sub>1</sub> depending on changes in the heart rate of the albino rat, first described by Birch and Harris, was investigated, as it seemed to offer important advantages over the usual methods. Results of assays on a sample of dried yeast and two samples of white bread indicated that the method is very satisfactory when dealing with uniform and fairly potent materials, but presents some difficulties with materials of low potency. The chief difficulty is to induce the animal to eat sufficient of the test material as a single dose. The advantages of the method are the reduction in the time required for an assay, the use of a less number of animals, and economy of the test material.

THE PERFUSION OF THE ADRENAL GLAND WITH REFERENCE TO THE MECHANISM OF ADRENALINE STABILIZATION, by R. D. H. Heard and A. D. Welch.—From an investigation of the chemical and physiological properties of the Ringer-Locke perfusate of the adrenal gland it has been shown that the stable sympathomimetic substance secreted is in reality stabilized adrenaline. The latter when added to perfused fluid is likewise stabilized and rendered resistant to oxidation. Stabilization is effected by means of an oxidation-reduction system involving ascorbic acid. On oxidation of the perfusate at 38° C. and pH 7.4, the pressor activity is maintained at its original level for a period of some hours before diminution becomes apparent. During this maintenance period the reducing power, as determined by titration with 2:6-dichlorophenol-indophenol, gradually decreases and reaches zero when diminution in pressor activity commences. The oxygen-up-take curve given by the perfusate is characteristic of an oxidation-reduction system; irreversible oxidation of adrenaline does not take place so long as a small amount of ascorbic acid remains present in the reduced state. The coupled systems, ascorbic acid-adrenaline and glutathione-adrenaline, have been examined respirometrically; the oxygen uptake curves shown by these systems and that present in the perfusate are similar. There is not secreted on perfusion a substance more negative than ascorbic acid which would effect reduction of the primary oxidation product of the latter. However, there is present in the perfusate an agent which minimizes the rate of autoxidation of ascorbic acid and thus tends to maintain the vitamin in the reduced state. The behaviour of the perfusate is adduced as experimental evidence in support of the hypothesis that the relatively large amount of ascorbic acid present in the adrenal gland is involved in a system needed to maintain adrenaline in the reduced state and to prevent pigment formation; it also suggests a mechanism by which adrenaline may

be transported without destruction under the aerobic conditions which exist in the systemic circulation.

BLOOD PHOSPHORUS FOLLOWING ADMINISTRATION OF IRRADIATED ERGOSTEROL AND PARATHORMONE, by C. B. Weld and J. F. Sykes. Following large doses of parathormone there is but little change in the inorganic P, ester P or lipid P of the blood or plasma while the serum calcium is rising. After the calcium has risen the inorganic P of blood and plasma and the lipid P of the blood rise considerably; the ester P is unchanged.

Following large doses of irradiated ergosterol the inorganic P and lipid P of both blood and plasma rise concurrently with the serum Ca; the ester P is unchanged. Smaller doses of irradiated ergosterol to normal dogs, or large doses given to dogs rendered tolerant to parathormone may, however, cause a reduction of ester P and lipid P of the blood while the serum calcium is rising.

After parathyroidectomy, the inorganic P and lipid P of blood and plasma rise with the fall of serum calcium.

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## Special Correspondence

### The Edinburgh Letter

(From our own Correspondent)

One of the indirect results of the industrial depression has been that a greatly increased number of applications have been received for admission to the medical schools. The University of Edinburgh has decided to restrict the number of students in the Faculty of Medicine and to adopt a system of selection. This will have the effect of raising to some extent the standard of intellectual attainment required from candidates. It is intended that the number of entrants for the medical course in Edinburgh will be restricted to approximately two hundred. In this way it is hoped to avert the threatened overcrowding of classes.

Considerable interest is now being taken in this country on the subject of the artificial immunization of children against diphtheria. The results obtained in Canada and other countries have stimulated medical officers of health to organize schemes for this purpose. In 1924 the Public Health Committee of the County of Aberdeen instituted such a scheme, and between that date and 1930 over 9,000 children, mostly of school age, were immunized. The experience gained proved that the immunization was effective, as out of that number only 5 children contracted the disease. The Medical Officer of Health for the County has recently received the sanction of the Public Health Committee to



further develop this procedure. It has been decided to concentrate not only on children of school age but also on children under five years of age, as the mortality rate is much higher in that group than in other children. One of the chief difficulties to be overcome is obtaining the consent of the parents. Intensive propaganda work is accordingly to be carried out in the endeavour to secure as high a percentage of consents as possible. As in other branches of the medical service in this area it has been the policy to enlist the services of the general practitioners. They will accordingly take part in the work done in the schools, and will also immunize in their consulting rooms children of pre-school age who are not presented at the clinics provided by the Authority. The immunizing material is provided by the County Council.

The work of the late Sir James McKenzie regarding the early recognition and treatment of disease is universally known and appreciated. The Clinical Institute at St. Andrews in which he took such a great interest and which bears his name has now been in existence for fifteen years and an enormous amount of useful data has been compiled. The work done at the Institute has earned the special commendation of the League of Nations. All the medical practitioners in St. Andrews are on the staff of the Institute, and detailed records are kept of all cases examined. Children during the first two years of life are regularly examined and continuity of supervision is secured by means of close cooperation with the system of school medical inspection.

The British Medical Association has taken steps to follow up the report produced by the special committee which it set up to investigate the question of nutrition by authorizing the preparation of a supplementary report. This is intended to provide for the practical application of the findings of the original report by converting calories and food values into actual menus and recipes. The diet chosen is that for a man, his wife, and three children. Cookery experts are working out the details of the meals. These should prove very useful to the housewife and to teachers of domestic science.

The Association is also proceeding to appoint a special Committee to consider and report as to the best methods for the cultivation of the physical development of the civilian population. A great deal of interest is taken in this country in the various forms of sport, but there is a definite need for the promotion of schemes for physical culture among the community as a whole. The public is becoming more "health conscious" in these days, and it is well that medical organizations such as the British Medical Association should give a lead in this respect. What is aimed at is the education of the com-

munity as to the value of physical culture as a means of enhancing the physical development of the human body and thereby promoting a higher standard of mental capacity.

Under the Road Traffic Act of 1934, which came into operation on the 1st of January of this year, provision is made for the remuneration of doctors in respect of the emergency treatment of persons suffering from injury arising out of the use of a motor vehicle. This will do something to remove a grievance of which medical men in the past have frequently complained that they received no remuneration for such services. A fee of 12/6d is payable by the person using the vehicle at the time the accident occurred in respect of each person in whose case emergency treatment is provided by a practitioner, and in addition there is provision for the payment of 6d for every complete mile and additional part of a mile in respect of any distance in excess of two miles from the place whence the practitioner is summoned to the place where the emergency treatment is carried out and to return to the first-mentioned place. An oral request for the appropriate sum may be made to the person who was using the vehicle at the time of the occurrence or a request may be made in writing within seven days from the one on which emergency treatment was given. Provision is also made whereby a hospital in which such emergency treatment is given is entitled to claim a fee of 12/6d on the lines generally indicated above. The fees payable under the Act are recoverable by Court proceedings as if they were a simple contract debt due from the person who was using the vehicle to the practitioner rendering service.

R. W. CRAIG.

7 Drumsheugh Gardens,  
Edinburgh.

### The London Letter

(From our own Correspondent)

A certain amount of publicity has been given to what is called an "epidemic" of diphtheria. In effect, after a drop in the notification rate from 1930 onwards, a rise occurred during the winter 1933-34 in the returns for most parts of the country, and the usual summer decline did not occur last year. During the past few months the figures, week by week, have reached such a height that for the last fortnight of 1934 the number of notifications received exceeded the expected figure by 60 per cent. Some authorities think that the diminished rainfall of last summer is in some way responsible for the situation. Another possible point of view is concerned with the increasing number of children who are receiving immunization. The carrier rate increases in any section of the population parallel with the rate



of immune members, and until a very large percentage of the population at risk is immunized the effect may be to increase the case incidence. This contrast between the desire of parents or doctors for the immunizing of the individual child and the necessity for avoiding piece-meal immunizing of the community is more especially heightened by the occurrence in certain areas of specially virulent types of the disease and the death rate has shown a slight increase from 1932 onwards. Nevertheless, there is no occasion for panic and the "epidemic" gives the public health authorities a fine opportunity to urge the value of immunization.

The efforts made by the British Broadcasting Corporation to disseminate facts about diet have for the most part been widely applauded, but a recent remark about meat for young children has stirred the wrath of the vegetarians. This coincided with the publication of an interesting experiment in regard to first-class protein, about which there has been mild controversy since the time of the famous British Medical Association report on diet. Dr. Corry Mann, who some years ago showed the value of adding milk to the diet, already theoretically adequate, of school children, has now demonstrated that a pint of milk daily will enable health to be maintained without deterioration, even with a severe reduction in total protein. Substitution of an equivalent amount of meat for half the quantity of milk on this low protein diet was followed by a progressive deterioration in the physical condition. In other words the protein of milk appears to be of more value for purposes of nutrition than the protein of meat. An interesting development on which this conclusion has some bearing is the latest pronouncement of the Board of Education concerning the method by which children are to be selected for milk in the schools. Rigidly interpreted, an important circular has previously been held to mean that only children picked out at medical inspection as under-nourished were to be eligible. Now, it is stated that teachers are entitled to anticipate the medical inspection, and in this way children may be prevented from ever reaching the mal-nourished category.

London University has always presented an enigma even to Londoners, and until the central buildings in Bloomsbury are completed it is going to be difficult to "show" the university to any inquiring visitor. The educational task undertaken by the institution and the rightly regarded high standard demanded in degree examinations has its special difficulties in the medical world. About this there has been a running correspondence in the medical press for some weeks. The medical schools of the university teach a large number of students who never take a degree, but qualify with the

various diplomas, while of those who bravely set out for the M.B. a fairly high percentage falls by the way-side. Certain schools have decided in recent times only to take university students, and critics have not been lacking to point out how the M.B. is unattractive. It is unlikely that any steps will be taken until the various discussions now going on concerning the medical curriculum are completed and the majority taking part in the "debate" now concluding seem against any sort of science degree for those who take the preliminary scientific subjects.

Under the presidency of Mr. H. G. Wells a Diabetic Association has recently been formed to provide an organization for the benefit and service to diabetics. It hopes to promote further study and research and to safeguard the general interests of diabetics. In the program, as announced, is included a new publication called the *Diabetic Journal*, and the establishment of convalescent homes, schools, and holiday homes for children, boarding houses, and restaurants where diabetics can obtain suitable food. As there are probably somewhere about 100,000 such patients in this country the association should have a wide appeal, and it represents an interesting social development.

ALAN MONCRIEFF.

121 Harley St.,  
London, W.1.

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## Letters, Notes and Queries

### Hirschsprung's Disease

To the Editor:

Would you be kind enough to let me know what the latest opinion is *re* the treatment of Hirschsprung's disease. I have a case here, and I cannot find anything recommended, except resection, or short circuiting.

I understand that some work has been done by some men on the sympathetic system, *e.g.*, sympathectomy.

Amherst, N.S.,  
December 24, 1934.

Yours truly,  
A. E. MACKINTOSH

*Answer.*—Your letter of December 24th in reference to the treatment of Hirschsprung's disease is before me. One of the leading surgeons in Montreal states that the operation of ramisection is somewhat discredited at the present time, but he believes that good results may be obtained by removing the pre-sacral sympathetic ganglia and stripping the adventitia of the inferior mesenteric artery. Of

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Answers to questions appearing in this column should be sent to the Editor, 3640 University Street, Montreal.

course there are many other surgical procedures, such as colostomy, plication, colopexy, and entero-anastomosis, with or without resection. Medically speaking, it is said that the best results are obtained by the application of sine-wave electricity to the abdomen, and by combating toxæmia from the intestinal decomposition of food by the removal from the diet of all food containing animal protein, excepting milk and its products.

A short list of some of the chief papers on the subject that have appeared within the past year or two is given here. The article by Dr. D. E. Robertson is said to be particularly good.

Resection of pre-sacral sympathetic nerves: clinical application, W. M. Craig, *Surg. Clin. North America*, 1934, 14: 673.

Value of sympathectomy in treatment of Hirschsprung's disease, A. W. Adson, *Northwestern Med.*, 1934, 33: 276.

Results of sympathectomy in the treatment of peripheral vascular diseases, Hirschsprung's disease and cord bladder, A. W. Adson, *Ann. Int. Med.*, 1933, 6: 1044.

Treatment of dilatation of colon by sympathectomy, D. E. Robertson, *Tr. Amer. Surg. Ass.*, 1931, 49: 256.

Clarke, T. W. and Miller, F. M. (for a review of the literature), *Arch. Paediatrics*, 1931, 48: 553.

EDITOR

#### National Birth Control Association

To the Editor:

The National Birth Control Association has appointed a Medical Sub-Committee consisting of practitioners actively engaged in the teaching of contraception. The object of this Committee is to collect, coordinate and from time to time draw up for publication by the National Birth Control Association authoritative information on all aspects of contraception for the use of the medical profession.

This Committee is in consultation with research workers, manufacturers, birth control clinics (both voluntary and under the public health authorities) and doctors engaged in teaching contraceptive methods throughout the country.

Although much valuable experience exists, the results of which are at the disposal of the National Birth Control Association, the whole subject is still at the research and experimental stage, and it is necessary to be constantly reviewing and re-assessing the methods in current use. This Committee would therefore be glad to hear from any doctor, clinic or manufacturer interested in birth control, in order that it may have the fullest sources of information possible.

All communications should be addressed to the Secretary, The National Birth Control Association, 26 Eccleston Street, S.W.1.

Yours faithfully,

H. HOLLAND,

November, 1934.

Acting Secretary

#### The Late Professor Léon Bernand

To the Editor:

As a tribute to the memory of the late Professor Léon Bernand of Paris, the Health Organization of the League of Nations has decided to create the "Léon Bernand Foundation".

I have been asked by the Medical Director of the League of Nations, Doctor Ludwik Rajchman, to intimate to friends and acquaintances in Canada of the late Professor Léon Bernand that contributions to the Léon Bernand Foundation capital fund sent to Doctor Rajchman will be most gratefully received. His address is: Dr. Ludwik Rajchman, Medical Director, Health Section, League of Nations, Geneva, Switzerland.

I would greatly appreciate it if reference to this project could be made in an early number of the *Canadian Medical Association Journal*.

J. G. FITZGERALD,

Director, School of Hygiene  
and Connaught Laboratories.

Toronto,  
January 9, 1935.

#### Topics of Current Interest

##### The Nature and Food Value of Beer

Since the return of beer to a place of importance in the diets of many persons in this country the medical profession should be well informed concerning the contents and physiological effects of this drink.

Beer is essentially a fermented beverage prepared from an infusion of hops and malted barley, with or without unmalted cereal grains other than barley. A brief description of the essential steps of manufacture has been recently given by Mathis and Bailey.<sup>1</sup> The first step is the preparation of malt, for which purpose barley is usually chosen. The process consists in steeping the barley in water to facilitate germination, which is followed by drying. The development of enzymes, primarily diastase and protease, is the primary object of malting. The second essential step is the preparation of "mash". The diastase of malt is sufficient to convert more than the starch in the malt itself into fermentable sugar; hence the practice of mashing a mixture of malt with raw (unmalted) cereals. The malt and raw grains are crushed and mixed with water, and the "mash" is allowed to stand at suitable and controlled temperatures. During this process the cereal starches are converted into ferment-

1. MATHIS, W. T. AND BAILEY, E. M.: Beer, Bull. Connecticut Agricultural Experiment Station, 1934, 363: 660.



able sugars and the proteins are in part transformed into soluble forms such as amides, peptones and albumoses. The liquid is drawn off, the mash washed, and the washing added to the liquid. This product constitutes the beer wort. After the wort has been boiled, hops are added and the boiling is continued. After cooking and sedimentation, the wort is drawn off or filtered and is ready for fermentation. The final process of fermentation is produced by the addition of selected cultures of yeast and may be carried out in various ways and at different speeds. Naturally this is only a general description of the process, since each constituent and each step is part and parcel of the distinctive nature of different types and brands of beer.

One of the final products of especial importance is the alcoholic content, which has been the subject of numerous reports.<sup>2</sup> Thus soon after the 3.2 per cent beer legislation an analysis of fifty-two brands of beer was made by the New Hampshire State Board of Health and reported in the *Journal of the American Medical Association*.<sup>2b</sup> The average alcoholic strength of these samples was found to be 3.68 per cent by volume. The lowest was 3.2 and the highest was 4.1 per cent. Similarly Mathis and Bailey report the analysis of the alcohol percentage by volume of a number of beers before and after repeal of the eighteenth amendment. Of thirty-seven domestic light beers before repeal, the average alcohol by volume was 3.7 per cent, the maximum 4.03 and the minimum 3.01. Of ten light beers (many of the brands included in the earlier analysis) analyzed after repeal, the average alcohol by volume was 4.64, the maximum 5.23 and the minimum 4.02.

The food value of beer, as measured by calories, is not wholly dependent on the alcoholic content. For example, Lusk<sup>3</sup> states that "a litre of German beer contains from 3 to 4 per cent of alcohol and from 5 to 6 per cent extractives. It yields 450 calories to the body, only half being derived from alcohol, the rest from dextrin and protein-like extractives. Here is a food material whose 'fattening' properties may be very highly considered." Christie<sup>4</sup> has considered the same subject in relation to the nutritive value of other fluids containing alcohol. While the number of calories per ounce of the malt liquor is for the most part lower than that of an equal quantity of wines, liqueurs and spirits, the former are usually taken in much larger quantities than the latter and hence the total calory intake is generally more. Christie

concludes, therefore, that light beers are ideal for the undernourished, and if the calories of beer are added to those of the usual diet there would seem to be no doubt of the practical value of his statement.—*J. Am. M. Ass.*, 1934, 103: 1951.

### Homo Sapiens Delawarensis

Dr. W. H. Woods, Mount Brydges, Ont., announces the discovery of a pre-historic human skull, the only one ever found in Canada and recognized as being pre-historic. Workmen found it at the bottom of a twelve foot face of gravel in a pit at Delaware, Ont. This gravel pit forms part of the middle one of three terraces which the Thames River has at this point. Dr. T. H. Clarke, Professor of Palæontology, McGill University, says this gravel terrace "accumulated quite rapidly over a period of not more than fifty to one hundred years, some fifteen to twenty thousand years ago."

The skull, of the modern type, is of that of a male Indian, of powerful physique and about sixty years of age. It is scored by the stones and is somewhat distorted in shape from the gravel pressure.

A bird stone was found, a couple of hundred yards from the gravel pit, several feet below the surface, while an excavation was being made for a road bridge abutment in the middle of the river. Probably this artefact would be contemporaneous with the Delaware man and would show the inhabitants at that time were possessed of a very considerable amount of skill. Within less than a ten mile radius from Delaware in each of three situations, the remains of a mastodon have been found. One of these, almost a complete skeleton, like the skull, has been presented to the University of Western Ontario, at London.

The Americas were colonized from Asia, via a land bridge, where now are the Behring Straits, over which men and animals were free to come and go. All the varying types of men in America until the time of Columbus were just variations of this primitive strain, caused by the environment in the different places they settled.

### On Some Words and Their Uses

In their well known book on the art and practice of medical writing, G. H. Simmons and Morris Fishbein write that as bricks are the individual elements that form the structure of the house, so words are the individual elements in the structure of an article. They go on to state that words poorly chosen or wrongly used, like cracked or discoloured bricks, may destroy the pleasing effect of an otherwise perfect edifice. Some people do not seem to

2. (a) MATHIS AND BAILEY.<sup>1</sup> (b) Beer and Alcohol, Bureau of Investigation, *J. Am. M. Ass.*, 1933, 101: 1579.

3. LUSK, G.: *Science of Nutrition*, ed. 4, Philadelphia, W. B. Saunders Company, 1928.

4. CHRISTIE, W. F.: *Nutritive value of wines and beers, Practitioner*, 1932, 129: 721.



mind if their houses are built of cracked or discoloured bricks. A frequent contributor to medical journals once said: "Why won't you let us write as we speak; what does it matter whether we use what you call King's English or not?" This man spoke the commonly used jargon of the wards and the laboratory. His meaning was probably clear to himself and to those who spoke as he did, but sometimes his words passed beyond the stage of ambiguity and conveyed a meaning that he obviously did not intend them to convey. It may be useful to give some examples of words and phrases that are often wrongly used.

The greatest confusion appears to exist in the minds of medical writers between a test and the result or reaction that follows its application. They write: "In this condition the test is positive", "He gave a positive test", and so on. A test gives a result; it produces or does not produce a reaction. When a man talks or writes of a positive test, one wonders whether his method of using the test or whether his interpretation of its result is as inaccurate as his description. Again, many people profess to find pathology in organs or tissues, or they say that pathology is shown on an x-ray film. The word pathology cannot mean anything else than "that branch of medicine which treats of the essential nature of disease, especially of the structural and functional changes caused by disease". Pathological change occurs in a tissue or an organ. Another word that is done to death is the word "marked". This is merely a habit. The word is used so often that the reader is at a loss to know what the author means by it. Three out of four signs or symptoms mentioned by most clinicians are "marked". If tenderness is intense, why should it not be described as intense? To call it marked is absurd when in the next phrase the writer or speaker uses the word in reference to some symptom that merely attracts the patient's attention. It would show commendable zeal if some high-minded purist would offer a prize to the first clinician who could give a clinical demonstration at a Branch meeting without using the word "marked". And what horrible things are done to patients in the name of medicine! Patients are explored, they are operated, they are refracted, they are collapsed. Authors sometimes insist on using expressions of this kind in spite of protest. Simmons and Fishbein are eloquent in this regard: "Such usage of intransitive verbs in the transitive sense has no justification in the laws or grammar, nor in the usage of people of even ordinary education. Even less justification exists for transposing ordinary common nouns into verbs which do not exist. Astronomers never telescope the

sky; bacteriologists never microscope their slides; but urologist do not hesitate to cystoscope their patients." In addition, we may ask whether there has ever been a radiologist who did not x-ray his patients, and how many there are who do not speak of the skiagram as the ray: "The ray shows a calculus."

Apart from such cacophonous jargon medical writers are extraordinarily careless, especially when they mean to be impressive. One or two examples will make this clear. A well known consultant wrote not so long ago that in "malignant disease of the breast it can safely be predicted that death will occur unless some other fatality intervene". A surgeon wrote that he thought it quite right to start an operation with an empty stomach. The reader wondered whether the surgeon had not mistaken his vocation, and whether he was not thinking of some sacerdotal rite in which he would like to take part. Later in the narrative it appeared that the reference was probably intended for the patient's stomach and not the surgeon's. The late Clifford Allbutt is said to have revised his manuscripts four times before sending them to the publisher. Osler wrote five times before he was content with his efforts. Anatole France, whose choice of words must be the envy of all who read his works in the original, insisted on seven revisions and thought that an eighth was desirable. If a paper is worth presenting to a medical audience on account of its subject matter, it is a poor compliment to the audience to think that no trouble need be taken with the method of its presentation.

Most students of English know and value Fowler's "Modern English Usage". They revel in what he has to say of inaccuracies, of elegant variations, of genteelisms, and so on. Would that a medical Fowler might arise to write on English usage for medical men. How he would satirize the modesty of those who scorn to use the first personal pronoun, but refer to themselves as "one"; how he would laugh at our various 'ologists—phthisiologist is the latest to appear on the horizon—and he might suggest that there were such persons as pneumokoniosialogists and hysterosalpingographologists. He would ask the writer on lesions of the upper abdomen how many abdomens he had; medical jargon would give him endless scope for satire.

The end of the matter is that we should pay serious attention to the correct use of words. At the same time we should not lose our sense of humour—we should laugh at ourselves and occasionally at one another. This would be a useful antidote to carelessness. — *Med. J. of Australia*, 1934, 2: 549.

## Medico-Legal

### IV.

#### Alexander v. Kirkland\*

*New Brunswick—X-ray burns—Negligence of specialist—Statutory limitation—Meaning of “professional services”—Distinction between action for malpractice and for assault—Standard of care—Duty to warn patient before giving x-ray treatments—Duty of x-ray specialist to diagnose patient's condition before giving treatments.*

This was an action for damages against a specialist for burns caused by his alleged negligence in the giving of x-ray treatments.

For some time prior to the spring of 1931 the plaintiff had been troubled with an irritation of the rectum. Whatever may have been the actual cause of the trouble, x-ray treatments were prescribed, and the plaintiff was referred to the defendant, as the x-ray specialist at the Saint John General Hospital. The x-ray treatments were administered, the first on March 3, 1931, the second on March 21st, according to the defendant and the hospital records; on April 13th, according to the plaintiff. Some time after this second treatment a burn developed, which subsequently ulcerated, causing the plaintiff great pain and inconvenience, and prevented her from carrying on her work in the ordinary way. When these burns began to develop she communicated again with the defendant, the last of these visits being, according to her testimony, on the 23rd or 24th of July. The defendant, however, swore that he had not seen her after the 13th of April, when he examined her but gave her no treatment. This point was to have some importance.

Before discussing the plaintiff's allegation that the burns and subsequent inconvenience suffered by her were due to the defendant's negligence, the court considered the defence that the plaintiff's action was barred by a statutory limitation. A technical defence of this kind is of course of particular interest to the lawyer, but might perhaps be referred to here. The defendant's contention was that the plaintiff's action was barred under section 37 of the New Brunswick Medical Act,<sup>1</sup> which provides that no duly registered member of the New Brunswick Medical Society shall be liable to any action for negligence or malpractice by reason of professional services requested or rendered unless such action “be commenced within one year from the date when in the matter complained of such professional services terminated”.

The defendant argued further that he was a servant of the Commissioners of the Saint John General Hospital as a roentgenologist only; that the plaintiff employed the commissioners and not the defendant to treat her; and, while admittedly this would not relieve him from responsibility for negligence when actually administering the x-ray, still, once the treatments were given, his work was over and his responsibility must end with that. Since even the plaintiff admitted that no x-ray treatments were given after April 13, 1931, this would mean that the action, having been instituted on May 23, 1932, would be barred under section 37.

To this the plaintiff replied with two arguments in particular. It was said, first, that the professional services “in the matter complained of”, referred to in section 37, ought properly to include any subsequent professional advice, attention, or prescription connected with or arising out of the original treatments, and that such advice, attention, or prescription had been given within the period of a year, namely, as late as the 23rd or 24th of July. With the plaintiff's interpretation of section 37, namely, that professional services “in the matter complained of” included any subsequent professional advice, attention or prescription, the court agreed, but as a question of fact it held that there had been no consultation whatever with the defendant later than April 13, 1931, and therefore that the plaintiff's action was barred.

The plaintiff argued, secondly, that the action, even if barred under section 37 of the New Brunswick Medical Act, as being an action for negligence and malpractice, might still be maintained as an action for assault, in which the statutory limitation is two years instead of one. To this the court replied that “assault would arise where an operation or treatment altogether unauthorized or requested was given; malpractice, where negligence occurs in the execution of an operation or treatment authorized or requested,” and that the action in this case was obviously one for malpractice and barred by the statutory limitation of one year.

This in itself was sufficient for dismissing the action. The court, however, in view of the important questions of medical practice involved, discussed exhaustively the merits of the action. The discussion, though perhaps of lesser value from the legal point of view, since it could have no effect on the final decision of the case, is not less interesting for that reason to a medical man, and should be referred to here. The general rule as to the degree of care and skill required of those engaged in the practice of medicine is in fact this. Every person practising medicine or any other learned profession undertakes to bring to the exercise of it a reasonable degree of care and skill. The

\* Decision rendered on August 6, 1934, in the Supreme Court of New Brunswick, King's Bench Division, and as yet unreported. A decision on an incidental question of procedure in the same case, delivered by Barry, C.J.K.B., is reported in (1934) 2 D.L.R. 525.

1. 10 Geo. V. (1920) c. 52.



medical man does not undertake that he will perform a cure, any more than the attorney undertakes that he will gain his client's case. He does not undertake to use the highest possible degree of skill, but he does undertake to bring a fair, reasonable and competent degree of skill to the case.<sup>2</sup> In other words, there is no liability for honest error of judgment. Before the medical man is responsible he must have shown an absence of reasonable skill and diligence, must have shown, in the common law phraseology, negligence, or, in the civil law, fault. But in deciding what is reasonable care and skill a more stringent test is applied to the specialist than to the ordinary practitioner. "Special profession involves higher duty; and the standard to be attained is that of the specialist amongst medical men, and not that of the general practitioner, and this includes proper instructions to the nurses and to the patient for their conduct in the intervals of the doctor's attendance."<sup>3</sup>

It had been alleged, first of all, that the defendant had been negligent in not giving his patient a sufficient examination to discover if she suffered from an idiosyncrasy and, therefore, if she were a subject to whom x-ray treatments could be administered without bad effects. On this point the court held that there could be no negligence, since there is no known method of determining in advance whether a particular person suffers or not from such an idiosyncrasy.

Secondly, the plaintiff alleged that the defendant had not, before administering the x-ray treatments, warned the plaintiff of the possible harm that might result from them. It was said that, while x-ray is a powerful agent for good, its nature is not yet thoroughly understood, and, in consequence, its use should be attended with the greatest possible care, particularly when the possibility of an idiosyncrasy is taken into account. Since it is recognized that idiosyncrasy does exist and that it cannot be foretold, there was therefore a legal duty on the x-ray specialist to warn his patient of the possible harm that might result even from a normal dose. To this the court said, "I have come to the conclusion that there is no legal duty cast upon a specialist to warn a patient in every case of the possible deleterious consequences that might result from a treatment. To insist upon the application of such rule in every case, upon the theory that, on account of the possibility of the existence of an idiosyncrasy in the patient harm might result, would, in my opinion, be much more harmful than beneficial. An atmosphere of uneasiness, restraint and fear would frequently be created where none need exist, all of which would react prejudicially upon both doctor and patient. In

my opinion it is a question that must depend upon the circumstances of each case. If the patient insists on being told everything, he must be told; it is his right. If the specialist intends to produce a burn, or there is any reasonable likelihood that a burn may result, the patient should be told. If from the knowledge and experience of the specialist, and considering the character of the proposed treatment, there is no reasonable likelihood of danger, but only the remote possibility from an existence of idiosyncrasy, there is not, in my opinion, a legal duty to warn the patient of possible deleterious effects on that ground. I find that the defendant was not negligent on the ground mentioned in this item." All these remarks are important since the present case seems to be the first one in which the duty of an x-ray specialist to warn his patient before giving treatment has been definitely adjudicated upon in Canada.

It was alleged, thirdly, that the defendant was negligent in not giving the plaintiff a sufficient and proper examination to ascertain if in his opinion she was actually suffering from an ailment which should have been treated with x-ray. The court held, however, that there is no duty upon an x-ray specialist to diagnose the patient's condition when she has come from a reputable physician, as had been the case here. Other allegations of negligence on the defendant's part were made, but they are of less interest and, in all, the court held for the defendant, dismissing the action with costs.—G.V.V.N.

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## Abstracts from Current Literature

### Medicine

#### **The Monocyte, Monocytosis, and Monocytic Leukosis: A Clinical and Pathological Study.**

Doan, C. A. and Wiseman, B. K., *Ann. Int. Med.*, 1934, 8: 383.

Modern studies leave no doubt as to the separate identity of the monocyte. It is one of the two types of cells arising from the reticulo-endothelial system. Monocytes can be found regularly arising in the spleen and peripheral lymph nodes, but only under pathological conditions, in the bone marrow. Criteria by which the monocyte and the monoblast may be recognized are discussed.

Nine cases of monocytic leukæmia were carefully studied, 5 coming to post-mortem. Considerable evidence was found to support the contention that the monoblast, lymphoblast, and myeloblast arise from a common stem cell. In all their cases, the authors found a "shift to the left" in both the lymphoid and myeloid

2. *Louphier v. Phipos* (1838) 8 C & P. 479.

3. *Beven on Negligence* (4th edition), page 1355.



cells, but unequal division of nucleoli and asymmetrical distribution of nuclear chromatin occurred only amongst the monocytes. Only in the so-called monocytic leukæmia does one encounter the liberal sprinkling of myelocytes and young lymphocytes together with the monocytes. It is probable that cases described as being mixed leukæmia are really of the monocytic variety. The epithelioid cell of the tubercle has proved to be but an altered phase in the life cycle of the monocyte. Coincident with the increase of these cells in the tissues in tuberculosis there is an increase in their representation in the blood stream. It has been established that the lipoids of the tubercle bacillus are solely responsible for the monocyte-epithelioid proliferation in tuberculosis. Conversely, the cellular reactions in certain diseases known to involve disturbances in the lipid metabolism appear to be largely of monocytic origin. In typical Hodgkin's disease the characteristic blood picture includes an absolute, as well as a relative, monocytosis. This disease provides an interesting transition between the group of diseases showing a monocytosis and those definitely leukæmic in nature. In the authors' cases of monocytic leukæmia the histopathology of the lymph nodes and spleen was indistinguishable from that of typical Hodgkin's disease.

It would seem that the basic studies of the effect of tuberculo-lipoids on monocytosis may help in the elucidation of Hodgkin's disease, the xanthomatoses, and monocytic leukæmia.

H. GODFREY BIRD

#### **Treatment of Chronic Heart Disease by Total Ablation of the Thyroid Gland.** Davis, D., Weinstein, A. A., Riseman, J. E. F. and Blumgart, H., *Am. Heart J.*, 1934, 10: 17.

This is a study of the rate and character of changes in the heart size in 37 patients, and changes in the electrocardiographic voltage in 32 in whom artificial myxœdema was produced by total ablation of the thyroid gland. Observations were made on three groups of patients. The first was a group of 22 with congestive failure due to various types of heart disease. The second comprised 10 patients with angina pectoris, and the third, 4 patients with no heart disease. The degree of hypothyroidism was estimated by measurements of the basal metabolic rate, the velocity of blood flow, the blood cholesterol and the signs and symptoms of myxœdema. It would appear that the changes in heart size in those cases of congestive heart failure were due to two opposing factors; namely, the effect of the hypothyroid state tending to increase the size of the heart and the restoration of circulatory compensation tending to decrease the size of the heart. Fifteen cases with congestive failure showed an increase in the size of the heart; 3

showed no change, and 4 showed a decrease. Of those with angina pectoris, 8 showed an increase and 3 no change, and those with no heart disease showed an increase in heart size in 3 cases, and in 1 no change was noted. In the majority of cases in all groups the electrocardiogram showed a low voltage of P and T waves; the other cases showing no change. It was observed in this series that in spite of the changes in heart size the patients showed a disappearance of the signs and symptoms of congestive failure or angina pectoris, with persistence of improvement for three to twelve months, and in no case was there impairment of cardiac function following operation. It is concluded, therefore, that the myxœdema heart, in the sense of a condition aggravating or precipitating attacks of congestive failure or angina pectoris, does not develop when hypothyroidism is produced by total ablation of the normal thyroid gland in patients whose metabolism is maintained at about minus 30 per cent.

W. H. HATFIELD

#### **The Relation of Amidopyrin and Allied Drugs to the Etiology of Agranulocytic Angina.** Jackson, H., Jr., *Am. J. M. Sc.*, 1934, 188: 482.

The author has made a statistical study of available cases of agranulocytic angina with special reference to the rôle of amidopyrin (pyramidon) in the etiology of the disease. The study was suggested by various published reports emphasizing the frequency with which the disease follows the administration of this or other drugs of similar nature, all of which contain a masked benzene ring. In all 27 cases were investigated. In 26 of the cases studied the disease followed the administration of amidopyrin or allied drugs. However, 44 per cent of the patients received no drugs of this type, and yet their clinical and hæmatological pictures were similar in every respect. In the remaining 30 per cent of the cases a critical examination of the histories shows that although such drugs had been taken, yet they could not have had any causative relation to the disease.

E. S. MILLS

### **Surgery**

#### **Intussusception in Infancy and Childhood.**

Ladd, W. E. and Gross, R. E., *Arch. Surg.*, 1934, 29: 365.

This report is based on 372 cases of intussusception during the period from 1908 to 1932, inclusive, which were recorded at the Children's Hospital, Boston, when 121,515 patients were admitted to the wards and private wing of this hospital. Eighty-seven per cent of the cases occurred in children under two years

of age, and 70 per cent in children between the ages of 4 and 11 months, with the peak of incidence with those at 7 months. The youngest patient was 17 days old and the oldest 11 years. The authors state that, unfortunately, from the study of their material no contribution has been made to the knowledge of the pathogenesis of intussusception. Fourteen of the invaginations were caused by inverted Meckel's diverticula, two by intestinal polyps, one by an enterocyst, one by a lymphoma of the ileum. These were the only demonstrable factors. Their studies do not support the contention of Fraser that intussusception is commonest among children of the poor, because errors in diet are the most frequent in this class. In their series the condition occurred most frequently in well developed and well nourished children.

The most frequent symptoms were attacks of abdominal pain, pallor, sweating, vomiting, and bloody stools, occurring in a previously healthy child. On physical examination the chief findings were shock, dehydration, a palpable abdominal mass, blood from the rectum, and, possibly, a mass palpable by rectal examination. In the ileo-colic variety roentgen examination was characteristic, but in the average case of acute intussusception was not necessary. The treatment was by operative reduction and resection, where reduction was not successful. Only two of the resection cases survived. The mortality in all cases, in five year periods, has shown a steadily downward trend from 59 per cent in the 1908-1912 group to 14 per cent, in the 1928 to 1932 group. Sixty cases were seen in the past five years within thirty-six hours from the onset of the lesion and all recovered from the operations.

G. E. LEARMONTH

**The Operative Treatment of Facial Palsy.**  
Duel, A. B., *Brit. M. J.*, 1934, 2: 1027.

The author, with Sir Charles Ballance, attempted the direct repair of the facial nerve by introducing a freshly excised graft from another nerve into the gap left by the removal of a piece of the facial nerve in the aqueduct. After a year's experimental work in monkeys they had demonstrated that facial movements both voluntary and emotional could be restored in this manner. Autoplastic grafts either from motor or sensory nerves, reversed or unreversed, could be used. Subsequent work on clinical cases revealed that the gap to be bridged might be anything up to 200 mm. The anterior femoral cutaneous nerve was therefore selected as providing a suitable length of graft. The first response to faradism in the clinical cases occurred after a period of months. The abnormal delay in the appearance of recovery was believed due to the time taken for Wallerian degeneration to develop in

the graft. Therefore if a graft which had undergone degeneration before transference was used this abnormal delay should not occur. This hypothesis was tested experimentally by using a graft from the anterior femoral cutaneous nerve which had been divided proximal to the graft 3 weeks prior to the operation. Facial response was restored in from one-quarter to one-half of the time required when fresh nerve graft was used.

The facial nerve is uncovered by removing the outer wall of the aqueduct, working upward from the stylomastoid foramen. When it is necessary to uncover the nerve above the horizontal semicircular canal the approach is from the back. The nerve is uncovered from 5 mm. above the lesion to the stylomastoid foramen. Its sheath is slit with a very sharp Graefe knife. A section including the scarred area of the nerve is removed, being cut off clearly and squarely. The previously prepared graft, handled with the utmost gentleness, is then laid in, and not stretched. Oozing of blood is controlled while the graft is laid in, to prevent blood collecting between the ends of the graft and the recipient. The ends then become glued together sufficiently to prevent subsequent entrance of blood. The slit sheath is laid against the graft, and the incision covered with a strip of dentist's gold leaf. The wound is left open and packed loosely with gauze wrung out of normal saline. The superficial dressing is changed daily. At the end of a month the wound is closed. Faradic stimulation may be carried out at this time. Response indicates returning voluntary and emotional power in the muscles.

STUART GORDON

**Obstetrics and Gynecology**

**The Vomiting of Pregnancy Treated as a Temporary Relative Insufficiency of Maternal Cortico-Adrenal Function.** Kemp, W. N., *Med. Rec.*, 1934, 140: 239.

The cortico-adrenal theory postulates that the nausea and vomiting of the first trimester of pregnancy are specific manifestations of a temporary relative insufficiency of the secretion of the vital maternal adrenal cortex. It is based on the following known clinical and experimental data: (1) the maternal adrenal cortex undergoes hypertrophy during pregnancy; (2) the earliest signs of cortico-adrenal insufficiency in experimental animals are anorexia and vomiting; (3) in human beings with cortico-adrenal insufficiency (Addison's disease) the earliest clinical symptoms are anorexia and morning sickness; (4) the post-mortem findings in women dying from hyperemesis gravidarum are remarkably similar to the necropsy findings after complete adrenalectomy in animals and to those



found in human beings dying from Addison's disease.

The secretion of the adrenal cortex, cortin, is essential to all higher animal life. When it is absent or totally insufficient death is inevitable unless exogenous cortin and (in a crisis) intravenous fluids are supplied. In pregnancy the presence of the fetus throws an increased metabolic load upon the mother; consequently there is need for an increased quantity of that apparent hepatic catalyst, cortin. If the woman's cortico-adrenal function were just adequate for her normal needs before pregnancy, then following conception there will exist a temporary state of cortico-adrenal insufficiency which will continue until the adrenal cortex has hypertrophied to meet the increased demand for cortin. Presumably this adequate hypertrophy occurs about the end of the third month of pregnancy. During the period of temporary partial cortico-adrenal insufficiency which exists in 50 per cent of women nausea and vomiting occur.

Prior to February, 1934, 202 cases of vomiting were treated by 47 different physicians in Vancouver; 173 (85.6 per cent) were either completely relieved of symptoms (as in the vast majority of cases) or were definitely improved. Of the 29 failures at least 11 were of the late and severe type of vomiting; in at least 3 of the balance the onset of pregnancy was very unwelcome. The most effective mode of therapy was the immediate subcutaneous injection of a potent cortico-adrenal extract (250 per cent liquid suprarenal extract, Armour). One ampoule injected daily for one or two days was usually found sufficient to cause immediate and complete cessation of vomiting. As soon as improvement with the hypodermic medication is noted the daily ingestion of 9 to 12 grains of the dessicated suprarenal extract should be commenced, and this can be cut down to 6 grains after the patient feels normal. The medication can usually be discontinued at or before the end of the third month.

ROSS MITCHELL

**An Account of Obstetric Methods at St. Mary Abbots Hospital, Kensington.** Theobald, G. W., *Brit. M. J.*, 1934, 2: 850.

During the first twelve months under the arrangement described over 800 patients were confined without resorting either to Cæsarean section or to induction of labour in the treatment of contracted pelvis or of the toxæmias of pregnancy. Twelve out of 13 infants were born spontaneously with the occiput in the posterior position. The forceps rate was under 3.5 per cent. The morbidity rate was the lowest recorded by any hospital in England.

The methods used in the labour ward can be carried out in any tenement dwelling in the

country; no sterile gowns, towels, masks or stockings being required. A manoeuvre for estimating whether the head can pass through the pelvis is described. It is suggested that rendering the urine alkaline during the puerperium by administering potassium citrate is of importance in preventing morbidity. A technique for preventing mastitis and breast abscess is given. The value of the prophylactic use of anti-streptococcal serum is stressed. It is suggested that the maternal mortality would be lessened if midwives were not allowed to make vaginal examinations. It is further suggested that the increasing maternal mortality rate must be attributed to increased operative intervention.

ROSS MITCHELL

**The Treatment of *Trichomonas Vaginalis* with Sodium Perborate and Quinine.** Kahn, I. W., *Am. J. Obst. & Gyn.*, 1934, 28: 511.

A series of 47 cases have been observed and treated. A patient was not considered cured until she had reported repeatedly for examination after six, nine, or twelve menstrual periods without evidence of leucorrhœa, itching, or other annoyances suggestive of recurrence of the infection, and negative hanging-drop microscopic examinations. The only excuse for reporting such a small series of cases is the uniformity of the prompt relief experienced by the patients and the apparent permanency of the end-results.

After a careful history, the patient is examined; a hanging-drop specimen is taken from the vagina and trichomonads identified; cultures are made and a smear stained for gonococci. Having established the diagnosis of *Trichomonas vaginalis* vaginitis treatment is begun. Two quarts of a solution of two tablespoonfuls of sodium perborate at 100° F. are used to irrigate and distend the vagina by means of a special occluding vaginal syringe. After the irrigation has been completed, the vagina is wiped dry, a suitable speculum inserted, and quinine sulphate powder is blown into the anterior posterior and lateral fornices, down to the introitus, using a Powdex powder blower. The labia are separated and more powder is blown over the vestibule and external genitals. The patient is instructed to report daily thereafter for a week, and every alternate day for the next week. No vaginal douches or suppositories are prescribed. Treatment is not interrupted by a menstrual period, although no irrigations are given during the flow; the vagina is merely wiped dry, freed of clots, and insufflated with the powder. The amount of quinine blown into the vagina at each sitting is equivalent to 7½ grains, and in very bad cases, no more than 15 grains. This is enough to coat all the vaginal walls and the external genitals.

ROSS MITCHELL



### Pædiatrics

**The Relapse in Scarlet Fever.** Anderson, J. S., *Arch. of Dis. in Child.*, 1934, 9: 373.

The author states that in England during the past ten years scarlatina has been relatively benign in character, the mortality seldom exceeding 1 per cent. We have come to expect the development of immunity after an attack of scarlatina, but this is not invariable, as is often proved by the occurrence of second attacks and relapses. Anderson points out that the benign type of the disease prevalent at the present time frequently fails to produce immunity in the patient, so that second attacks and relapses appear to be more common than they were, and may, indeed, be even more common in the future. He suggests that the partial and insufficient immunity which is present in mild cases may be augmented by the injection of scarlatinal toxin. Apart from the personal aspect of the case, the problem has an important economic and public health bearing.

JOHN NICHOLLS

**Cutaneous Myiasis in Infants.** Silverthorne, N. and Brown, A., *Arch. of Dis. in Child.*, 1934, 9: 339.

Drs. Silverthorne and Brown, of Toronto, report three cases of this somewhat rare affection. The lesions resembled insect bites, pustules, or boils. They occurred on the face, head, or arm, and were multiple. When the lesions were well advanced maggots were noticed therein. The infestation was due to burrowing of the larvæ of a fly known as *Wohlfahrtia vigil* Walk. Infestation by this fly was first recorded by E. M. Walker who reported 2 cases in 1920 and 2 more in 1922. Eight cases in Canada have been reported up to 1931. Most occur in the month of June and in infants who had been sleeping out of doors. It is said that the flies are to be found along railway tracks, and the larval form probably develops in young mammals (Walker). The lesions, naturally, occur on the exposed parts of the body, where the larvæ can actually penetrate the skin. Children sleeping out of doors should be carefully screened.

JOHN NICHOLLS

### Ophthalmology

**Newer Knowledge of Bacteriology Applied to Ophthalmology.** Gowen, G. H., *Am. J. Ophth.*, 1934, 17: 820.

While experimenting on the source of staphylococci in the normal conjunctiva, rough colonies (R) were frequently recovered from the skin surfaces around the eye. The rôle of these has been conceded to be that of a non-virulent mutant of the smooth (S) type. This smooth-to-rough change is being more and more

thought of in terms of immunological response, with a resultant defensive mechanism. That the change from S to R is an attenuation phenomenon was early voiced by Pasteur.

The following criteria are, in general, characteristic of the R mutant type. The colonies are rough, irregular and flat, agglutinate in broth, with an expansive growth on agar; the colonies on agar are translucent, the secondary colonies, seldom; biochemical inactivity; atypical morphology; loss of motility in motile species; no capsules; more frequently present in carriers and convalescents; and greater susceptibility to phagocytosis.

A study was made of the colonies recovered from the eyelids of 5 persons. The characteristics of these R type forms were in accordance with the list given above. The author's conclusions are as follows: The fact influencing S to R mutation is constantly present on the normal skin surface around the eye. The potency of this factor is proportionate directly to the distance from the lid borders. This factor may be related to the acid reaction in the skin, and is diminished or absent in pathological skin conditions around the eye, but returns on convalescence. The S to R mutation on the skin is a protective mechanism; the percentage of S to R mutation may be taken as an indicator of the power of the skin to resist infection and to rid itself of exogenous organisms. The low normal limit of skin resistance might arbitrarily be given as 10 to 15 per cent, and anything below 10 could be considered potentially a susceptible skin. A low percentage is associated with the presence of *S. aureus* or *citreus* on the skin. By classifying the skin surfaces of the eyelids according to the degree of resistance on the basis of S to R mutation, and by building up this resistance in susceptibles by biological methods, the common staphylococcal infections around the eye, particularly styes, can be prevented.

S. HANFORD MCKEE

**Xerosis in the Eye Clinic: A New Local Treatment.** Cornet, E., *Ann. d'Ocul.*, 1934, 171: 484.

Xerosis, xerophthalmia, or keratomalacia, is due to absence of vitamin A, or more exactly "avitasterinose A". It was not until 1902-1903 that Mackenzie and Koun noted the relation which existed between this disease and the state of nutrition.

Xerosis is an ocular disease found especially in the Orient and often causes blindness. It may be cured by local treatment, but the prognosis remains serious because of the relation of the disease to the patient's general condition. The treatment suggested by Cornet is as follows. The subconjunctival injection of fresh sterilized milk of 115°, 0.5 to 1 c.c. in an eye every 2nd, 3rd, 4th and 5th day; instillation

of olive oil or cod liver oil; prescribing of milk, human or fresh from healthy cows, or boiled. Yolks of eggs, green vegetables, oranges and cod liver oil are also prescribed. The serum of Quinton, and appropriate pulmonary and intestinal examination and treatment are made use of. In the case of a xerosis ulcer the instillation of olive oil and cod liver oil should be omitted. Atropine or eserine, plus argyrol or "argovyl", as indicated.

S. HANFORD MCKEE

**Senile Cataract; Post-operative Plastic Iritis; Means of Avoiding this Complication.**

Cerchez, V., *Ann. d'Ocul.*, 1934, 171: 406.

Plastic post-operative iritis does not occur in patients where the extraction of the lens is done in the capsule. On the other hand, it is very frequent in patients operated upon for cataract by removal of the capsule, or where much lens substance is left behind. Besides infection, the remaining lens substance undoubtedly plays an important part in the appearance of the iritis. Post-operative iritis may appear not only in persons with a positive Wassermann but also where it is negative, as operative trauma may play an important part in its appearance. This post-operative accident may be avoided by employing atropine and ointment from the second day after operation, continuing it regularly for ten days. By this means iritis may be avoided, and the formation of adhesions and the appearance of exudate in the pupil, which latter, even with intense treatment, is absorbed with great difficulty, and often lessens visual clearness. Plastic iritis is cured by local treatment alone. General treatment is given only in cases where indicated, and, of course, must be accompanied by local treatment. General treatment given as a preventative before operation does not prevent plastic iritis.

S. HANFORD MCKEE

**Neurology and Psychiatry**

**Subdural False Membrane or Hæmatoma (Pachymeningitis Interna Hæmorrhagica) in Carcinomatosis and Sarcomatosis of the Dura Mater.** Russell, D. S. and Cairns, H., *Brain*, 1934, 57: 32.

The association of these pathological conditions with one another is of considerable interest, since it shows one manner in which subdural hæmatoma can be produced. Four cases of metastatic neoplastic infiltration of the dura associated with subdural false membrane or hæmatoma are described, and the records of 24 other cases of metastatic neoplastic disease of the dura in which no hæmorrhage or membrane was observed with the naked eye are briefly presented. In the former cases the subdural false membrane or hæma-

toma was formed in the areolar layer of the dura. It was a consequence of dilatation, engorgement, and rupture of the capillaries of the areolar layer. When the dura is involved locally by a circumscribed metastasis or diffusely by direct spread it is unlikely that a subdural hæmatoma will also be found. The essential type of neoplastic involvement appears to be a permeation of veins and capillaries of the dense layers of the dura, the tumour having spread to these vessels from the overlying skull. In the areolar layer immediately adjacent to the endothelium lining the subdural space there is a rich network of large capillaries with ampullary dilatations. These drain outwards into a second plexus in the dense dura, and thence either to the periosteum of the calvaria or to veins that accompany the main meningeal arteries. Obstruction of the veins in the outer dense layers of the dura will produce dilatation of the capillaries in the inner areolar layer. These capillaries are poorly supported on the inner side, especially when the intracranial pressure is low. It is probable that the formation of subdural hæmatoma depends in large part on these peculiar features of the areolar layer.

FRANK A. TURNBULL

**Head Injury—Neurologic and Psychiatric Aspects.** Strauss, I. and Savitsky, N., *Arch. Neurol. & Psychiat.*, 1934, 31: 1.

The subjective post-traumatic syndrome, characterized by headache, dizziness, inordinate fatigue on effort, intolerance to intoxicants, and vasomotor instability, is organic and is dependent on a disturbance in intracranial equilibrium due directly to the blow on the head. Negative results on neurological examination and a normal mental status are no final criterion of the presence, absence or degree of damage to the brain resulting from head trauma. No opinion should be formed in doubtful cases without a systematic clinical study—neurological examination, psychological, psychiatric and ophthalmological survey, oto-neurological investigation, and study of the spinal fluid (including encephalography).

Careful, exhaustive neurological examination will result in fewer cases with no evidence of focal involvement of the nervous system. Vagueness of a clinical finding is no proof of its psychogenicity, nor is one's inability to explain or understand a sign or symptom evidence that it is functional. Neglect of the study of the conscious mental processes is, in part, due to the assumption that minimal psychic defects are functional. An organic reaction syndrome is present in the less severe, as well as the severe, instances of head injury. Ready fatigability, emotional lability, difficulty in thinking, and mild symptoms of mental defects are similar to changes in the early stages



of the organic psychoses. Extensive defects in the visual fields may exist without any complaint. A correct technique in the study of the visual fields is important. The watch test for hearing and simple clinical tests for labyrinthine function are inadequate. Encephalographic pictures must be evaluated in the setting of the whole clinical complex, including the history. A history of encephalitis, convulsions, or retarded development before the accident should make one extremely cautious in the interpretation of encephalograms. The pictures give limited but valuable information. They permit one sometimes to gauge the degree of cerebral damage, or at least to convince oneself that organic changes took place.

FRANK A. TURNBULL

### Dermatology

#### Cutaneous Diphtheria in Congenital Syphilis.

Cohen, M. H., *Arch. Dermat. & Syph.*, 1934, 30: 207.

The case is reported of an eleven-year old girl who had had a profuse, muco-purulent, odoriferous nasal discharge for a year and a half following a slight trauma. There was a great deal of crusting, and when the crusts in the nares were removed the nose collapsed, revealing the fact that the septum had been destroyed. A blood Wassermann test was made which was four plus, so she was given neoarsphenamine every five days for six doses without improvement in the lesion. Then a culture was made from the nose and the throat and a pure culture of Klebs-Löffler bacilli was obtained from both sites. She was given 10,000 units of diphtheria antitoxin and healing of the nasal lesion was very marked in one week's time.

The report of this case serves as a timely warning to be on the look-out for cutaneous diphtheria, and also stresses the oft-repeated statement that a positive Wassermann reaction does not explain every sign or symptom that a patient may have.

NORMAN M. WRONG

#### Follicular Lesions in Vitamin A and C Deficiencies. Scheer, M. and Keil, H., *Arch. Dermat. & Syph.*, 1934, 30: 177.

Lowenthal's report in November, 1933, on "Cutaneous manifestations in vitamin A deficiency" prompted the present report. Two cases are reported. The first patient had scurvy which responded well to an antiscorbutic diet. She showed non-inflammatory, follicular keratoses of the lower part of the thighs and upper legs. The second had had scurvy periodically, due to eliminating fruits and vegetables from the diet on account of a very persistent colitis. This patient showed a symmetrical eruption on thighs and legs. The

lesions were dull red, fleshy, follicular papules, in which was a curled-up hair. The tourniquet test caused the appearance of numerous petechiae confined chiefly to the hair follicles. There was also a toxic neuritis of the anterior roots which caused some atrophy of the muscles of the left leg. These follicular lesions in scurvy have been recognized for many years, Jessner having described them in 1893. It is only since 1931 that follicular lesions of vitamin A deficiency have been recognized.

The authors feel that skin manifestations of early cases of vitamin A deficiency and of scurvy are almost identical, but in advanced cases of scurvy one sees evidence of vascular damage about the hair follicles, which is the distinguishing feature.

NORMAN M. WRONG

### Therapeutics

#### The Causation and Treatment of Oedema.

Bennett, T. I., *Brit. M. J.*, 1934, 2: 929.

The author discusses chiefly the problems of renal and cardiac oedema. The two great factors responsible for oedema, i.e., excess fluid in the tissues spaces are, first, changes in the intracapillary blood pressure, and, second, the lowering of the colloidal osmotic pressure of the plasma proteins. The normal intracapillary pressure is about 27 m.m. of mercury at the arteriole end and 13 m.m. at the venule end. Systemic hypertension does not raise the intracapillary blood pressure, except in the stage where there is cardiac failure. Then, the increased pressure comes from the venule end, so that the normal return of fluid to the capillary is impeded, producing oedema. Increased capillary permeability is not stressed here as a cause of oedema; it is probably only important in the production of oedema of the urticarial type; it may be a factor in the oedema of acute nephritis. It is pointed out that sodium chloride is not a causal factor in oedema, but is favourable to the condition, in that it tends to hold water in the tissue spaces rather than in the circulation; the sodium, not the chlorine, ion is responsible.

As regards treatment, cardiac oedema calls for prolonged rest, and digitalis in appropriate cases, a salt-free diet, and the employment of mercurial diuretics in resistant cases. Of these salyrgan is by far the best, having few contraindications. The author considers that these mercurial diuretics represent the greatest advance in the treatment of cardiac failure by drugs since the introduction of digitalis. In all cases of oedema accurate record of the water balance (fluid intake and output) is most important. Acute pulmonary oedema tends to occur in cases of left-sided cardiac failure. It is one of the most urgent of medical emergencies and is an indication for prompt vene-



section and the administration of morphine. The œdema of nephrosis and the nephrotic syndrome is due solely to loss of protein from the blood plasma, and calls for a diet that is salt-free and relatively rich in protein. Mercurial diuretics may be used in resistant cases. The œdema of glomerular nephritis calls for very cautious treatment. In the acute phase virtual starvation is necessary; in chronic cases careful judgment is required for the accurate regulation of the protein in the diet and the avoidance of anything which might further damage the kidney.

W. FORD CONNELL

#### The Histidine Treatment of Peptic Ulcer.

Bulmer, E., *The Lancet*, 1934, 2: 1276.

Acting on the assumption of previous investigators that peptic ulceration may be the result of a bodily deficiency in essential amino-acids the author has treated 52 cases with intramuscular injections of histidine. He gives 5 c.c. of a 4 per cent solution daily for three weeks. Of the cases treated 58 per cent became symptom-free, with normal radiograms; 19 per cent, symptom-free, with persisting abnormal radiograms; and 23 per cent were unaffected. Of 32 cases followed two to ten months after treatment 22 remained symptom-free, 3 relapsed, and 7 previous failures failed to show any subsequent improvement.

The treatment was ambulatory. No instructions about diet were given and no medicines ordered. There were no local or general reactions to the injections. The author found that cases of gastric ulceration were more amenable than those of the duodenum, and he found also that cases presenting symptoms of long-standing did not react as well as those of shorter duration.

G. A. COPPING

#### The Therapeutic Effect of Total Ablation of the Normal Thyroid on Congestive Heart Failure and Angina Pectoris. IX. Post-operative Parathyroid Function. Gilligan, D. R., Berlin, D. D., Volk, M. C., Stern, B. and Blumgart, H. L., *J. Clin. Investigation*, 1934, 13: 789.

The observations of Blumgart and his associates have shown that in patients without thyroid disease complete removal of the normal thyroid must be performed, to assure a persistently subnormal basal metabolic rate. This operation, of course, involves invasion of the territory of the parathyroid bodies. Hence it has been feared that intractable tetany might be a sequel. On 73 consecutive patients on whom total thyroidectomy was performed, signs and symptoms of mild parathyroid deficiency were manifested after operation in 12, or 17 per cent. In these 12 the phenomena were transient, disappearing within two weeks. The manifestations of hypoparathyroidism are

attributable to injury rather than to removal of the parathyroid glands. The transient tetany which sometimes occurs immediately after total thyroidectomy can be controlled by calcium therapy. Persistent parathyroid insufficiency occurs so rarely that it does not constitute a contraindication to total thyroidectomy.

JOHN NICHOLLS

### Pathology and Experimental Medicine

#### Proliferative and Exudative Tuberculosis with Reference to Their Relationship to the various Fractions Derived from the Tubercle Bacillus. Pottenger, F. M., *Ann. Int. Med.*, 1934, 8: 123.

The reaction between the tissues and the bacillus throughout the course of tuberculosis is a combination of cell proliferation and exudation, with or without tissue destruction. What reaction will take place is determined primarily by the tissues themselves, and, secondarily, by the numbers and virulence of the invading organisms. Heredity and environment, both internal and external, may greatly modify the reaction of the tissues. It would seem that our best conception of preponderantly proliferative tuberculosis is that it is primarily more a reaction of the tissues to the bacilli as foreign bodies than to them as living, multiplying microorganisms. It is an infection in which structural defence predominates over physiological defence. To the lipoid component of the tubercle bacillus has been assigned the property of stimulating the tissues to the formation of the tubercle. While the body is thus protected, a certain protection is also afforded the bacilli, so that they may not be destroyed and their protein liberated. It is believed that the protein of the bacilli, when liberated, is responsible for fever, causes proliferation of plasma cells, produces sensitization of the body cells, and calls out the allergic reaction later. The predominantly proliferative case is mild in degree, is usually consistent with a long life, but does not heal readily. The course is frequently progressive, so that, sooner or later, structural protection fails. Bacilli develop in large numbers, and through their destruction large quantities of protein are freed. The mild proliferative lesion is caused to take on exudative characteristics. As a rule, the exudative reaction is confined to a limited area because of a certain amount of tissue desensitization due to the previous escape of small quantities of bacillary protein from the proliferative lesions. Proliferative lesions may be stimulated to allergic response and healing by the bacillary protein of tuberculin.

Preponderantly exudative tuberculosis, on the other hand, is more acute. Implantations

are made by large numbers of bacilli, and are accompanied by the liberation of large quantities of bacillary protein. Here physiological reaction predominates over structural defence. There is more danger of the disease spreading quickly, and more danger of tissue destruction. On the other hand, immunity develops more quickly, and these lesions will yield readily to treatment if it is applied at once. The infection is not coextensive with the exudative reaction, which is a local tuberculin reaction, and which, when cleared away, will leave a fairly free lung field. Being acute, this reaction comes on before the lung has been seriously injured by infection.

H. GODFREY BIRD

**Observations Concerning the Mechanism of Parathyroid Hormone Action.** Collip, J. B., Pugsley, L. I., Selye, H. and Thomson, D. L., *Brit. J. Exper. Pathol.*, 1934, 15: 335.

A survey of the available data has appeared to substantiate the view that the parathyroid hormone exerts its effect on calcium metabolism by a direct action on the bones. The authors set themselves to examine the validity of Ellsworth's suggestion that the increased excretion of phosphate in the urine which occurs after the injection of parathyroid extracts in human subjects is due to a lowering of the renal threshold, which latter is the cause of the subsequent rise in the level of serum calcium. To this end they completely removed the kidneys in 8 male albino rats and then injected them with 40 units of parathyroid hormone twice daily for 2 days, killing the animals 48 hours after the operation. They then studied the bones histologically. They conclude that the characteristic effect of the parathyroid hormone on the bones of rats is obtainable after bilateral nephrectomy, and hence cannot be ascribed to an action of the hormone on the renal threshold for phosphate. Since the histological changes in the bone in hypervitaminosis D are entirely different from those observed in hyperparathyroidism it is difficult to believe that irradiated ergosterol acts merely by stimulating production of the parathyroid hormone.

JOHN NICHOLLS

**Cancer of the Stomach in Two Brothers.** Pack, G. T., *Ann. Surg.*, 1934, 100: 1017.

A 52 year old man was operated upon for carcinoma of the stomach. The tumour was situated in the antrum of the pylorus, and was diagnosed as an adeno-carcinoma, grade III. While he was in the hospital his 54 year old brother visited him, and related to the surgeon that he had lost about ten pounds in the last month worrying over his brother. He had never had any nausea or vomiting, no pain, no discomfort to suggest that he might have a

cancer. More to allay his fears than to find a cancer an x-ray picture was taken, which revealed cancer in the antrum of the pylorus. He was operated upon; the site of the tumour was the same in his case as it had been in the brother, and the histological diagnosis was adeno-carcinoma, grade III. Both cancers were in the operable stage. There are four others in the family, and the surgeon is examining them periodically for gastric carcinoma.

MADGE THURLOW MACKLIN

## Hygiene and Public Health

**The Cellular Response of Lymph Nodes to Various Dust Suspensions Introduced into Lymphatics.** Stüber, K., *J. Ind. Hyg.*, 1934, 16: 282.

Some time ago a method was reported in these columns for determining the pathogenicity of certain dusts by the production of a cellular response in the peritoneum. This is a similar method, using the lymphatics as a site for injection and the lymph nodes as the place to observe the cellular response. Various dust suspensions were injected. The cellular response of the lymph nodes to the injection of dusts with a considerable free silica content is essentially different from that to other particulate material, the latter being phagocytosed only by normal lymph phagocytes. The pathological picture is described in detail. It is suggested that this method may be developed into a rapid means of determining the toxicity of certain dusts.

FRANK G. PEDLEY

**The Cellular Response of Lymph Nodes to Suspensions of Crystalline Silica and to Two Varieties of Sericites Introduced through Lymphatics.** Drinker, C. K., Field, M. and Drinker, P., *J. Ind. Hyg.*, 1934, 16: 296.

It has been suggested that the cause of silicosis may really be due to sericite and not to free silica itself. Sericite is essentially a combination of silica and  $Al_2O_3$ . Applying the method of Strüber of injecting lymphatics, and using the resultant cellular reaction in the neighbouring lymph nodes as a gauge of the toxicity of different dusts, it was found that injections of sericite produced similar reactions to the injection of pure silica. It must be inferred that dusts containing sericite will upon inhalation react as does crystalline silica.

FRANK G. PEDLEY

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An Arab proverb runs as follows:—

“The world is supported by four columns:  
The justice of the great;  
The prayer of the righteous;  
The bravery of the valiant;  
The science of the physician.”



## Obituaries

Dr. Arthur Irvine McCalla, of Calgary, died at his home on January 16, 1935, from pneumonia. His death is a distinct loss to our profession in this city, as he was recognized as one of our leading surgeons and an able consultant. He had made a place for himself in the esteem of his confrères, not only by reason of his skill as a surgeon but also by the feeling of good will and confidence which he always inspired.

Dr. McCalla was born in St. Catharines, Ont., forty-eight years ago, receiving his preliminary education there. Proceeding to Toronto University, he graduated in Arts and in 1911 in Medicine. Following an internship he took an extensive course in pathology, and as a skilled pathologist came to the Calgary General Hospital in 1914. In the same year he joined the firm of Drs. Crawford, McEachern and Merritt, and was associated with them until his death. He is survived by his wife and three sons. His first wife predeceased him nearly three years ago. His mother, Mrs. M. McCalla; a brother and six sisters, living in St. Catharines, Ont.; and a brother, W. C. McCalla, of Calgary, also survive.

### APPRECIATION BY DR. A. H. BAKER, PRESIDENT OF THE CALGARY MEDICAL SOCIETY

Since the Society last met, we have lost an esteemed member, and a worthy Past-president. Dr. McCalla spent his active professional life of some twenty-one years in this city. Here were passed the years of effort, which saw a well-trained recent graduate of Toronto, unknown and unassuming, develop into a physician and surgeon of a high degree of skill, and enjoying the confidence of a large group in the community. We who were more intimately associated with him and more cognizant of his worth know that we, collectively and individually, have lost a friend.

It is now a quarter of a century since McCalla and I sat side by side in lectures. May I say, that throughout the intervening years my respect for him has steadily increased. His was the spirit of a scientist, reserved, industrious, absolutely honest with himself and others, and possessed to an effective degree with the courage of his convictions. He was a professional man, but beyond that a gentleman with high ideals of life and of human values. Not long ago he told me of the pleasure he found in studying the cello, so that he might join with his boys in their music. It was Goethe, I believe, who said—"He is happiest, be he king or peasant, who finds peace in his home"; and so we see a man busy with his profession, but slipping away at night and on Sundays to enjoy his family life in the quietness of his home, amidst the beauty of its surroundings.

Dr. McCalla brought to his work industry, scientific training and honesty, and, may I be permitted to say, that these qualities, which he exemplified day by day, have in my opinion, exerted a very appreciable influence over our profession and have resulted in our practice being lifted to a higher plane. It seems that Ibsen perhaps expressed the philosophy of Dr. McCalla in these words, "So to conduct oneself, as to realize oneself, this seems to me the highest attainment possible to a human being."

### A TRIBUTE BY MR. L. W. BROCKINGTON, K.C.

*"He does not die who can bequeath  
Some influence to the land he knows.  
Who dares persistent interweave  
Love permanent with the wild hedgerows.  
He does not die but still remains,  
Substantiate with his darling plains."*

If it be true, as we must believe it to be, that the memory of "a loyal heart homeward bound" continues as a benediction and an inspiration to those who outlive his pilgrimage, then the work and character of Dr.

Arthur Irvine McCalla will remain in this community as an influence for goodness and mercy and loveliness for many days.

First as pathologist to the General Hospital, and then as diagnostician and surgeon, he paid to his chosen profession the tribute of skill, patience, humility and loving kindness that it has always demanded and received of its noblest sons. Many a stricken household has cause to remember with affectionate gratitude the quiet unobtrusive doctor whose hand and head and heart healed or lightened its affliction. Like another beloved Physician he kept his vow that he would never enter the temple of science in the spirit of a money-changer. His work was to him a laboratory, ever opened and furnished for the careful and persistent search of truth.

His profession was but an opportunity for service to his fellow-men. Even his leisure hours were hours of devotion. The creation and continuance of the Calgary Symphony Orchestra were impossible without his determination and steadfast support. The office of president which his modesty declined, but which was his by right of service, was accepted only because his fellow-directors resolutely declined to consider his refusal and elected him in his absence.

His lovely garden was a pattern of the man himself. Nothing was out of place and untended; there were no weeds nor untidiness. It was a little miracle of applied science, and the tulips, the dahlias, and the sweet-scented stocks which he specially cherished were always the city's best.

His work, his music, his garden, and, not least, his family were his life. None of those who were privileged to share the geniality of his hospitable hearth will forget the evenings when his boys and himself joined together in playing the works of the great masters of music. Those memorable hours seemed to belong to a grand family tradition that is almost lost in the stridency of the modern world.

Dr. McCalla claimed for himself no virtues. To the strength of others he never denied praise; to their weaknesses he willingly gave charity and sheltering humanity.

Such was the wistful, kindly, gentle doctor, and of such is the Kingdom of Heaven.—In *Calgary Herald*, January 19, 1935.

Dr. Rodolphe Boulet, of Montreal, died in Prangins, Switzerland, on January 16, 1935. Dr. Boulet was born at Joliette, Que., in 1866. He studied first at the Seminary of his native town and then took his medical course at Laval University, Montreal, graduating in 1890. After having completed his course and his internship at Notre-Dame Hospital, Montreal, he set off for Europe to perfect himself in the study of oto-rhino-laryngology. With a reputation that had already preceded him Doctor Boulet returned to Montreal in 1893 and joined the staff of the Ophthalmological Institute in that city, and soon built up a splendid practice as a specialist. He became a member of the staff of our esteemed contemporary *L'Union Médicale du Canada*, of which he was president for nearly thirty years, and of which he proved to be a strong mainstay. On the death of Prof. Edouard Desjardins Boulet became chief of the clinic of the Ophthalmic Institute. For a short time he became director of the eye clinic of the Hôtel-Dieu. He was, at the instance of the late Professor Foucher, appointed Associate at Laval University. Later he became president of the College of Physicians and Surgeons of the Province of Quebec. He was a corresponding member of the Oto-rhinological Society of France and member of the American College of Surgeons. He was also one of the chief founders of the Association des Médecins de langue française de l'Amérique du Nord. He received the decoration of Officer d'Académie. Afflicted by a



strange mental depression, much to the distress of his friends and associates, in which he felt that he had not reached the ideals that he had set for his life, Doctor Boulet decided to live in Europe—not without hope, however, that he would some day return to Canada. But it was not to be. Doctor LeSage, Editor-in-chief of *L'Union Médicale*, towards the end of a touching tribute to his friend, quotes this from a letter of Dr. Boulet's in reference to the death of Harwood, another great friend, which seems singularly appropriate at this time. "Quant à moi je n'ai qu'à retenir ses qualités d'ami et de gentilhomme en tout et partout . . . J'en garde le souvenir d'un homme loyal, très bon, d'une sensibilité exquise, au contact des plus agréables, aux manières des plus correctes, et doué d'une âme des plus sympathiques. Avoir eu un tel homme comme ami pendant quarante ans est une grande faveur de la vie. Le perdre est une bien grande épreuve."

**Dr. William Wallace Kirtz Beasley**, of Sandwich, Ont., died on January 26, 1935, as the result of a fall from a train. The deceased was the son of Dr. W. J. Beasley, of Sandwich.

**Dr. John Nelson Coolidge**, of Ottawa, head of the Medical Division of the Metropolitan Life Insurance Company of Canada, died early in January. Interment was on January 10th.

**Dr. Lelia Ada Davis**, of Toronto, died on January 23, 1935. She was the daughter of the late Andrew and Elizabeth Pease Davis and sister of the Hon. E. J. Davis, of Newmarket and of E. P. Davis, K.C., of Vancouver.

Dr. Davis was a graduate of the University of Toronto (M.B., 1889).

**Dr. William Ainslie Goodall**, formerly of Galt, Ont., but latterly of New York, died during the first week of January, 1935.

Dr. Goodall was educated at Galt and Victoria University, Toronto, graduating in medicine in 1884, taking post-graduate work in St. Bartholomew's and Guy's Hospitals, London, Eng. He also studied in Edinburgh, Vienna, Paris, Berlin and Dublin. He served with the British Army in the Afghan campaign when the British forces were driven out of the Khyber Pass; in the Egyptian campaign for the relief of General Gordon and Khartoum, and in the Zulu and South African wars. He practised in the Bronx and was medical director of its great hospital. During his war career he was twice wounded and was mentioned in dispatches several times. He is survived by his wife, Elizabeth Anderson Goodall, a Canadian, and a brother, Alfred Goodall, Galt.

**Dr. Aaron James Hunter**, of Orangeville, Ont., died on or about anuary 31, 1935, at his residence, from septicæmia following a small scratch.

Dr. Hunter, who was in his 77th year, was a son of the late Mr. and Mrs. William Hunter of Amaranth Township, and after his early education in a small log school, he attended the local high school and then graduated from Victoria University (1887). During his career he practised in the following places, Everett, Orangeville, Allandale, Islington, Toronto. For five years he had charge of the Ontario Hospital at Woodstock. He had lived in Orangeville for the past 12 years and was jail surgeon. He was twice married, and is survived by one daughter, Mrs. Gerald Clarridge, of Timmins, by the first marriage; his second wife; and one sister, Mrs. W. J. Cook, of Toronto.

**Dr. William Frederick Jackson**, of Brockville, Ont., died at his home on January 29, 1935, after an extended illness. He was 82 years old.

Dr. Jackson passed his final examinations before he was 21 years old, and began practising at Brantford in 1873. It was there that he formed a friendship with

Dr. Alexander Graham Bell, and suggested what developed into the first metallic diaphragm to be incorporated into the telephone.

In 1874 he accepted a position as surgeon on one of the Allan Line steamships, and travelled between Liverpool and North American ports for about a year, after which he came ashore and established a practice at Brockville. He remained in the profession here for more than fifty years before retiring. He was a graduate of McGill University (1873).

**Dr. Lyman Craig Lauchland**, of Dundas, Ont., died suddenly on February 9, 1935.

Doctor Lauchland was born in Oshawa in 1878, and after receiving his primary education in the public and high schools of that place, attended McMaster University, Toronto, and, still later, McGill University, Montreal, where he graduated in medicine in 1904.

Twenty-eight years ago he established himself in practice in Dundas. As a Captain in the Canadian Army Medical Corps, he saw service during the Great War in France and England. Later, on his return to Canada, he was appointed Medical Officer of the Wentworth Regiment, and was promoted to the rank of Major in 1925. As a member of the Dundas Board of Education he gave devoted service which was rewarded by his being elected to the office of Chairman. He was Past-president of the Hamilton Medical Academy.

His widow; one son, Stuart, a student at the University of Toronto; a daughter, Louise, a nurse in training at the Royal Victoria Hospital, Montreal; and two brothers, W. G., of Toronto, and N. L., of Vancouver, survive.

**Dr. Alfred Lockhart**, of Toronto, died on February 10, 1935, after a brief illness.

Dr. Lockhart was born in Sydenham in 1867, and graduated from Queen's University in 1893 with the degrees of M.D. and C.M. He also took medical work in London, England, and obtained the diploma of M.R.C.S. On his return from England he practised at Harrowsmith, near the scene of his birth, but for the last fifteen years of his life had practised in Toronto.

He is survived by his widow; one son, Jack, of Toronto; one daughter, Mrs. E. N. Lawrence of Chateaugay, N.Y.; and two brothers, T. J. Lockhart, of Kingston, and Dr. George D. Lockhart, of King, Ont.

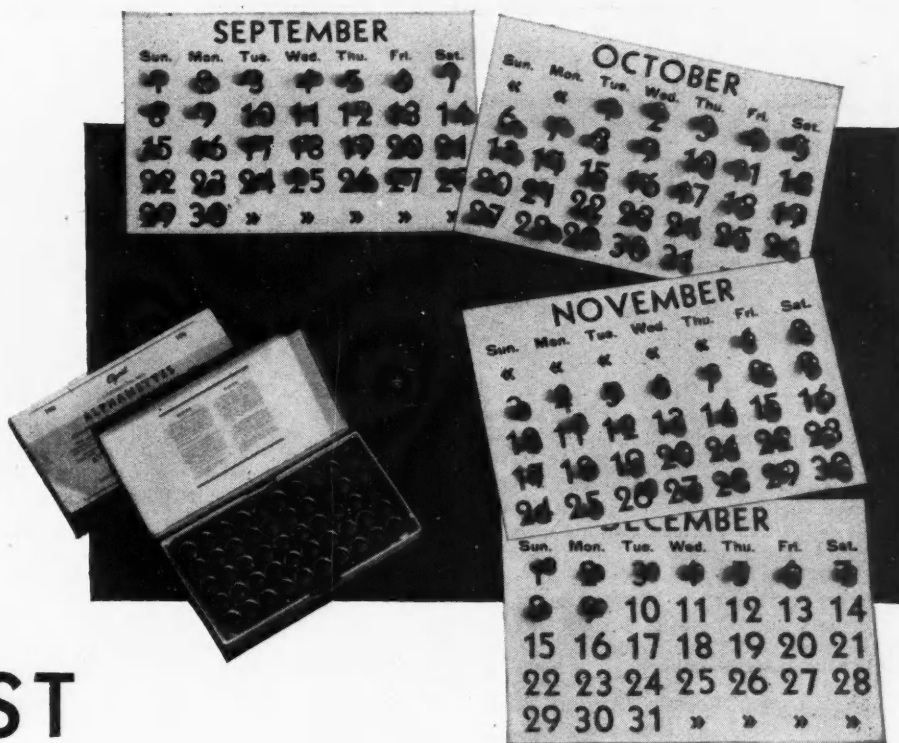
**Dr. Louis Valmore Massé**, of Warren, Ont., died at North Bay, Ont., on January 25, 1935. He was 61 years old, and a native of Joliette, Que. Before coming to Warren six years ago, Dr. Massé practised in Garthby, Cape Hope and St. Charles de Caplan, all Quebec towns, and Verner, Ont. Besides his widow, Dr. Massé is survived by one daughter in Sudbury, one daughter and two sons at home, and two sisters and two brothers in Montreal. He was a graduate of Laval University, Montreal (1894).

**Dr. Clarence Francis Moriarty**, of Annapolis, Md., U.S.A., and well known in Halifax, N.S., died on January 14, 1935, after an illness lasting a year. He died at the early age of thirty-seven, after giving great promise of an outstanding career.

Dr. Moriarty was born in Truro, N.S., the son of Mr. and Mrs. P. F. Moriarty, of Halifax, N.S. He was educated in the city schools of Halifax and at Dalhousie University.

Upon the outbreak of the war he was among the first to volunteer and he went overseas with No. 7 Canadian Stationary Hospital, Dalhousie Unit. Subsequently he obtained a commission in the Royal Air Force.

On his return to Canada, Dr. Moriarty re-entered Dalhousie University and graduated from the Medical School in 1925. His chosen field was public health and during his brief medical career he served in United States Departments of Health in the States of Mary-



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land and Virginia and also in the Philippines. As a public health officer his work was eminently successful, his particular field being malaria control. At the time of his death he was a Public Health Officer for the State of Maryland.

A little more than a year ago Dr. Moriarty underwent a serious operation. For a time his condition showed marked improvement but recently his condition became such as to cause grave concern.

Dr. Moriarty is survived by his wife, the former Dr. Angela Magee, of Saint John, N.B., and two small children; also by his parents; and one sister, Mrs. Jane Hutchinson, of Toronto.

**Dr. Anthony Oaks**, of Preston, Ont., died on January 18, 1935, after 48 years of medical practice in Hespeler and Preston.

Dr. Oaks was born in 1862 at Hespeler, and studied there and at the Galt Grammar School. He was a graduate in medicine of the University of Toronto (1888). He was Coroner for his district.

Surviving are his widow, Rose May Glick; five daughters, Mrs. C. S. John, Norwich; Mrs. William Graham, St. Mary's; Marion, Marjorie and Ellen at home; one son, Captain Harold Oaks, Sioux Lookout; two brothers and three sisters.

**Dr. Charles Rosaire Paquin** died in Quebec on January 24, 1935, at the age of 71. He was born at Portneuf, studied at the Petite Séminaire of Quebec, and graduated in medicine from the University of Laval, Quebec, in 1889. He was particularly interested in the subjects of hygiene and social economy, and organized the Temperance League of which he was secretary for many years. He also founded the *Bulletin Médicale* of Quebec. He was an alderman for Saint-Jean-Baptiste ward for several years, but resigned because he found he could not attend to his aldermanic as well as to his medical duties. He later went to Europe to study questions of municipal hygiene, and on his return was chosen as assistant in the Department of Municipal Hygiene, later becoming Chief.

**Dr. James Turner Rogers**, of Hamilton, Ont., died on December 27, 1934. Doctor Rogers was born in Gananoque and was a graduate of Trinity Medical College (1889). For a time after graduation he studied abroad, later taking over an industrial practice in England for a short time. In 1894 he came to Hamilton and opened an office at 174 James Street North, where he remained for some years, subsequently moving to Main and Bay Streets.

Although Dr. Rogers retired from active practice in 1924, his interest in his chosen profession never waned, and he continued to entertain the same lively interest in medical affairs that he evinced in earlier days. Of a genial disposition and a very hospitable nature, he had a host of friends in and out of the medical profession, and word of his death will occasion a widespread feeling of profound regret. Dr. Rogers had had extensive experience in lodge and industrial work, being for some years medical officer for the Steel Company of Canada.

He is survived by his widow, formerly Florence Amy Atkinson, daughter of the late Dr. Atkinson, of Gananoque; two daughters, Misses Florence and Barbara, of Hamilton; one son, Edward B. Rogers, in Gananoque; a brother, W. G. Rogers, Gananoque, and a sister, Mrs. Franklin Bradley, of Brooklyn, N.Y.

**Dr. J. Damien Vezina** died on January 13th at the age of 63 in Montreal. He was born in the United States and took his medical course at the University of Laval, Montreal, where he graduated at the age of 23 in 1894. He spent all his professional life in Montreal where he built up a large practice.

**Dr. Adam Edward Vrooman**, of Lindsay, Ont., died on January 27, 1935, following a very short illness. The late Dr. Vrooman was born in 1847, in the Township of Brock, a son of the late James Vrooman and Rhoda Johnston. He received his early education in the Lindsay Grammar School and later in Trinity University, where he secured his degree of M.D. (1871). For years he lived in the vicinity of Fingerboard, Mariposa Township, and later practised medicine in the village of Little Britain. He then moved to Lindsay, continuing to practise, but retiring from active work many years ago, when he was appointed Sheriff of the County of Victoria. He was married in 1873 to Miss Mary Whiteside, daughter of R. F. Whiteside, of Little Britain, who is the only immediate relative left to mourn his passing. He was a former Alderman and Mayor of the Town. The late Dr. Vrooman was always active in politics as a young man, and in 1900 he was elected Conservative member in the South Victoria for the Federal House, and in 1911 and again in 1915 he was elected a member of the Provincial House for West Victoria.

**Dr. Frederic Pottinger Yorston**, of Montreal, died on February 9, 1935, in his sixty-sixth year. Doctor Yorston was born at Douglastown, N.B., and graduated with B.A. and M.A. degrees from the University of New Brunswick. For ten years he was principal of Hawkins Academy, Newcastle, N.B., and among his pupils was the present Lord Beaverbrook. Then Mr. Yorston took up the study of medicine and came to McGill University, graduating in 1904. He practised at Sawyerville, Que., and in 1917 moved to Montreal. He was attached to the Children's Memorial Hospital, giving his services in the orthopaedic outdoor department. He is survived by his widow and one son, Fred. H. Yorston; one brother, W. F. Yorston, of Campbellton, N.B.; and a sister, Mrs. M. R. Benn, of Douglastown, N.B.

## News Items

### Great Britain

**Hunterian Society Gold Medal for Practitioners.**—The rules governing the award of this Medal have recently been altered. Any registered general practitioner resident within the British Empire is eligible to compete, and the Medal, which is of gold, is awarded annually to the writer of the best Essay on a subject selected by the Society.

Competitors—men or women—must be engaged in general practice, and Essays should be sent in by December 31st.

The Essay must be unpublished and original and be based on the candidate's own observation, but it may contain excerpts from the literature on the subject, provided that reference be made to the articles from which they are taken.

The subject selected for the Essay is, for 1935, "The Conduct of Midwifery in General Practice"; and for 1936, "Rheumatoid Arthritis: its Diagnosis, Treatment, and End-results".

A copy of the Rules and any further information can be obtained on application to the Honorary Secretary, Mr. Martin Oldershaw, 26, Upper Wimpole Street, London, W.1.

**A David Anderson-Berry Gold Medal**, together with a sum of money amounting to about £100, will be awarded in July, 1935, by the Royal Society of Edinburgh to the person, who, in the opinion of the Council.





## CALCULUS

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association meetings. The first day will be given over to business and the Annual Meeting of the College and the other days to the scientific programs.

G. E. LEARMONTH

### Alberta

At the Annual Meeting of the Council of the College of Physicians and Surgeons, Dr. W. G. Anderson, of Wardlaw, was elected *President* and Dr. W. V. Lamb, of Camrose, *Vice-President*. Dr. George R. Johnson was reappointed *Registrar-Treasurer*. This is the fourteenth year he has held this office. Mr. W. G. Hunt was reappointed assistant to the Registrar.

The Council is considering the publication of a quarterly bulletin, in which will be reported the doings of the Council, the Alberta Medical Association, as well as those of the local medical societies. Official circulars dealing with the profession, issued by the Provincial and Federal Governments, will also be included. The Registrar has been asked to gather further data and submit these to the Council for final action.

The Council made a grant of \$250.00 to the University of Alberta for medical scholarships in the Department of Medicine. The grant of \$100.00 which was made last year to assist in the current medical literature of the university was renewed again this year.

The Council, after calling on the profession to assist in setting fees for the various medical services, has reviewed the suggestions and combined the ideas as well as possible, and is issuing a new schedule as a guide to the profession. Never before has a schedule been issued which could be said to have been the combined opinion of the medical practitioners, as this will be.

The Council, in cooperation with the officers of the Alberta Medical Association, is reorganizing the medical profession, locally, districtly, provincially and federally, so that the greatest interest may be manifested by the members. Provincial autonomy will be preserved, but it is hoped that Federal cooperation will be strengthened. The Council will continue its functions as at present and the Association will further promote the scientific contact with the profession.

Health Insurance is a subject that will be to the fore in Alberta for the next six months, as the Government has made the announcement that their Director of Division of Communicable Diseases, Dr. A. C. McGugan, will commence almost immediately, to organize public meetings, to interest the people in establishing two "set-ups" to test out the scheme, as reported by the Commission and adopted by the legislature. If the scheme were to be province-wide at the commencement, that could be done without any agitation, but as it will have to be voted upon by the people in the district, and carried by a 75 per cent majority vote, it will be necessary to acquaint the people with what the plan contemplates and how it will be financed.

The Executive Committee of the Alberta Medical Association went on record as willing to assist the King George V Jubilee Cancer Fund with all their power.

It was unanimously agreed by the Executive that the Dominion Government should re-establish the division of Child Hygiene, and no longer leave it to a private volunteer body as at present.

The Alberta Medical Association has been studying the cases reported as maternal deaths, and finds many cases so reported are wrongly classed. They feel that certain questions should be placed on the report forms, the answer to which would facilitate the proper classification. They are planning to pass to the profession throughout Canada their suggestion in the near future.

The Annual Meeting of the Alberta Medical Association, will be held in Edmonton, September 16, 17, 18, 1935, in cooperation with the other western medical

### British Columbia

The Minister of Labour, Hon. G. S. Pearson, announced on January 10th that henceforward the wives of unemployed men on relief will be given a pre-natal allowance of \$5.00 per month for the four months preceding the birth of children. The entire expense of this addition will be borne by the provincial government. Upon the birth of the child this allowance will be replaced by the \$4.75 monthly allowance already provided for children.

Dr. Grant Fleming, Professor of Hygiene at McGill University, has arrived on the coast to act as secretary to the Health Insurance Committee of the College of Physicians and Surgeons of British Columbia. He addressed a meeting of the Victoria Medical Society on January 18th, and invited free discussion of the subject of the pending legislation. The speaker emphasized his opinion that what took place in British Columbia would be of great importance to the rest of Canada, because whatever act was adopted would be copied by other provinces if they took up Health Insurance legislation. The Federal government also would take an active interest in what took place here, as the subject had already been introduced in the Dominion Parliament. In the United States a committee is already preparing to advise the Chief Executive on Health Insurance plans.

Dr. Fleming spoke of the cordial reception which he had received from the provincial government, and the invitation which he had received to be present during the drafting of legislation. He considered that his function would be to present to the drafting committee what he should learn to be the views of the majority of the profession. The returns from the questionnaire which had been sent out by the College showed that while opinion was evenly divided on some points there was a considerable difference of opinion on others. He thought that there should be a central medical advisory committee to represent the profession, which should be nominated and given power by the profession, and not appointed by the government. The government was in agreement with this.

With regard to the Act itself, Dr. Fleming felt that the intention was to put as little as possible into the Act, and leave a great deal to the regulations accompanying it. This would provide for such alterations as might be dictated by subsequent experience of its working. Such subjects as the definition and control of specialists, the disciplining of its own members, maternity service, hospitalization, methods of payment, etc., must remain under the control of the profession. If the profession did not attend to this they would find the government doing it.

It was announced that the Provincial Secretary had promised that when the legislation had been drafted and submitted to the cabinet, it would then be placed before the representatives of the profession for their criticism before any publicity was given to its proposed provisions.

Discussion following Dr. Fleming's remarks was active and prolonged. Opinion was strongly expressed that the fund should be unlimited, that is, sufficient should be contributed by the Treasury to supplement the amount contributed compulsorily by prospective beneficiaries to cover the cost of all services to be provided. A motion was put and carried that the Victoria Medical Society go on record as opposed to a capitation fee, and that the fee paid the physician should be strictly for services rendered. Representation of this opinion will be made to the government

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by Dr. Fleming, as indicating the views of the majority of the profession in Victoria.

Dr. Fleming pointed out that many of the questions raised in the discussion would have to be decided by the aforementioned central medical advisory committee, and would not properly be a part of drafting the Health Insurance Act.

With reference to the proxies which had been sent out, as mentioned in the February issue of the *Journal*, it was announced that practically 100 per cent had been returned by the members of the profession in Victoria.

D. E. H. CLEVELAND

### Manitoba

During the last week of January Dr. D. A. Stewart, Superintendent of the Manitoba Sanatorium, addressed the Trudeau Society of Minnesota at Minneapolis on "The community vs. tuberculosis"; the Fellows and Faculty of the Mayo Foundation, Rochester; the medical students of the University of Minnesota on "Fifty years' progress in medicine"; and also the senior classes of the two Rochester schools of nursing.

The regular meeting of the Winnipeg Medical Society was held on January 18th. Dr. A. P. MacKinnon gave an address on "Sciatica again—a report of one hundred cases", and Dr. Norman Book gave "A report of four hundred cases of icterus neonatorum".

The Winnipeg General Hospital announces that the following have been appointed to the Honorary Attending Staff of the Hospital as Assistant Surgeons: Drs. M. B. Perrin, John Hillsman, A. W. S. Hay, and W. A. McElmoyle.

ROSS MITCHELL

### New Brunswick

On January 31, February 1 and 2, Dr. Wm. P. Murphy, of Boston, addressed the Saint Croix Medical Society at St. Stephen and the Saint John Medical Society at Saint John on the "Liver treatment of anæmia". At both places the attendance was very large, the meeting in Saint John being the largest since the extra-mural lectures were started.

Dr. Murphy maintained that in anæmia three systems were involved, the blood, the central nervous system, and the gastrointestinal, and that these three must be treated as a trinity. Comparable amounts of liver, oral liver extract, and intramuscular liver extract cost the patient \$5.00, \$17.00 and \$1.17, respectively. This cost comparison would indicate that the intramuscular treatment was preferable financially, and Dr. Murphy said that results paralleled this price range. His present system is to use two to four vials in one or two days at the commencement of treatment, followed by one vial intramuscularly each week for three weeks, following which one vial intramuscularly per month is frequently sufficient to keep the blood count normal. In relation to the exhibition of iron in anæmia, Dr. Murphy stated that there is sufficient copper in the ordinary Bland pill and in the vegetables in the diet to supply all the copper necessary. Iron therapy is a definite aid in the return to normal of the hæmoglobin and should be used. In some research work carried on, using intramuscular liver extract, it was noted that in a case of "la grippe" there was a definite increase in the leucocytes and reticulocytes while liver therapy was in progress. From this accidental finding the Doctor inferred that liver therapy might be useful in agranulocytosis. It was therefore tried with happy results. It is necessary to continue the treatment for some months or years, as the disease is prone to recur and the relapses are most serious.

Similarly, he has used liver in two cases of pneumonia with low white counts with excellent results. In cases of pernicious anæmia, where paræsthesias have developed recovery is usually complete. Locomotor incoordination is always improved and frequently completely cured by liver therapy. Any infection, or even a minor operation, occurring or being necessary in the course of treatment, causes the blood count to fall, and special measures should be adopted at these times.

Dr. Murphy stressed that one of the first signs in pernicious anæmia is a sore tongue; other patients have shown cardiac signs, especially angina, early in the course of their disease. Hydrochloric acid was given when this treatment was initiated, but the lecturer felt that it serves no useful purpose except in associated indigestion or diarrhoea. Dr. Murphy uses liver therapy in his secondary anæmias with quite as happy results as in cases of pernicious anæmia.

At the meeting in Saint John discussion was confined mostly to questions by Drs. Barry, McDonald, Walter Skinner, Curren, Baird, Nugent and Mackeen. Dr. Murphy illustrated his address with lantern slides and moving pictures.

This visit of Dr. Murphy's to New Brunswick is his first Canadian visit since he received the Nobel prize in medicine. He spoke to the Saint John Canadian Club on February 2nd on the subject of "Medical research and international goodwill". On February 1st, he addressed the visiting staff and invited physicians at the Saint John Tuberculosis Hospital, where his address was concerned with his trip to Sweden and the interesting details of his entertainment by the Nobel Prize Committee.

Dr. George Dumont, of Campbellton, has been seriously ill in hospital, suffering from whooping-cough and complications. We are glad to report improvement in his condition. It was reported from the same hospital that Dr. L. G. Pineault has also improved in health.

Dr. L. DeV. Chipman has been elected President of the Provincial Red Cross Society.

At the beginning of the year, Dr. S. H. McDonald, who for many years has been senior physician of the Saint John General Hospital and Chairman of the Medical Board, resigned his appointment. When the new appointments were made Dr. A. B. Walter automatically became senior physician. Other appointments to the medical side of the hospital included Dr. Murray MacDonald and Dr. S. H. Calnek. Dr. R. T. Hayes was advanced from junior to senior surgeon in the Eye, Ear, Nose and Throat Department. Two junior physicians, Dr. A. L. Donovan and Dr. H. A. Farris, were advanced to senior appointments in medicine. The remainder of the staff is unchanged.

A. S. KIRKLAND

### Nova Scotia

At the first meeting of the newly elected Municipal Council of Lunenburg, Dr. H. B. Campbell appeared before the Council and urged it to continue its grant to the School for the Blind in Halifax. The sum of \$200 was voted without dissent. At the same meeting Dr. C. Beckwith, of the Provincial Sanatorium at Kentville, also addressed the Council on tuberculosis. He emphasized the importance of patients in the early stages of tuberculosis being sent to the Sanatorium for treatment.

Dr. Samuel Marcus, of Bridgewater, was elected Health Officer for the municipality in the place of Dr. W. Cole who has resigned.

## Acute and Generalized Staphylococcal Infections

### Staphylococcus Antitoxin

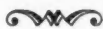
From various sources there has been an accumulation of evidence which suggests that much of the symptomatology of acute staphylococcal infections is attributable to liberation of staphylococcus exotoxin within the body. The serious nature of such infections would appear to be due in large measure to the highly pathogenic effects of staphylococcus exotoxin upon living cells and tissues. Consequently, the use of staphylococcus antitoxin has been advocated in the treatment of acute and of generalized infections where there is evidence that *Staphylococcus pyogenes* is the causal micro-organism. (See the issues of this Journal for June, July and August, 1934.)

As prepared by methods evolved in the Connaught Laboratories, Staphylococcus Antitoxin consists of refined and concentrated globulins from the blood-serum of horses which have been immunized against pooled toxoids and toxins of several selected strains of staphylococcus. Beneficial results have followed administration of this antitoxin in ACUTE CARBUNCLE and in CELLULITIS, OSTEOMYELITIS, MENINGITIS and SEPTICAEMIA, where staphylococcus has been the infecting agent.

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CANADA

Dr. W. W. Patton, a member of the Nova Scotia Legislature, was married on February 1st to Miss Phoebe Daye. For the next three months they will reside in Halifax, where Dr. Patton will attend the sessions of the Nova Scotia Parliament.

Dr. A. F. Miller, Superintendent of the Nova Scotia Sanatorium at Kentville, delivered an address on "Observations on the school health survey". This local survey was sponsored by the Victorian Order of Nurses in cooperation with medical practitioners and the staff of the sanatorium, where x-rays when required were provided at cost. Of interest are the figures that 66 of the school children gave positive tuberculin reactions and 85 per cent (46 children) were reported as having the "childhood" type of tuberculosis.

N. B. DREYER

### Ontario

The Attorney-general has announced the appointment of the following physicians as Coroners: Dr. Lorne S. Stokes, Hanover, Grey County; Dr. Norman V. Freeman, Battersea, Frontenac County; Dr. J. L. Mahony, Niagara Falls; Dr. H. L. Butters, Fort Erie, and Dr. A. G. Strang, Chippawa, all of Welland County; Dr. Duncan J. Mason, Kenora.

Dr. H. S. Burns, of Hamilton, has been appointed to the staff of the Ontario Hospital at Penetanguishene.

Dr. Evelyn Fleming, a graduate of the University of Toronto, 1926, is visiting Toronto. She has been in charge of the Canadian Hospital at Nasik, India, for two years, doing the surgery in this 90 bed hospital where a government training school for nurses has recently been established.

Arrangements are being made with the Hospital for Sick Children to care for the 3,000 children of York Township who require tonsillectomy.

At the annual meeting of the Toronto General Hospital the Superintendent reported 18,100 adult patients treated in the wards, with an average length of stay of 17 days. Seventy per cent of these were public ward patients and 80 per cent were surgical and obstetrical cases. The out-patient department report treating 132,163 patients.

It is announced that Calydor Sanatorium, on Lake Muskoka, a leading private hospital for the treatment of tuberculosis, proposes to discontinue its activities as an institution of this type. Calydor and its Superintendent, Dr. C. D. Parfitt, have played their part in the battle against tuberculosis and have seen a marked diminution in the death rate from tuberculosis in this province and Canada. The Chairman of the Board of Directors is quoted as saying, "We have not decided on the future, but we are not closing". It is hoped that this splendid plant with its most excellent equipment may continue as a hospital.

J. H. ELLIOTT

### United States

**The Association of Medical Colleges Compiles Fellowships.**—The Association of American Medical Colleges has revised and brought up to date its compilation of financial assistance that is available in the United States and Canada to the graduate medical student. This compilation is published in the form of a supplement to the May, 1934, issue of the *Journal of the Association of American Medical Colleges*. The publication contains the information arranged in a

very definite form under three indexes: (1) The institutions and organizations offering research and other opportunities for graduates in medicine. (2) The funds of scholarships and fellowships available. (3) A list of subjects and fields in which opportunities are offered. For further information, address the secretary, Dr. Fred C. Zapffe, Association of American Medical Colleges, 5 South Wabash Avenue, Chicago.

**General Goethals 3-cent Canal Zone Stamp.**—With the issue on August 15th of the General Goethals 3-cent Canal Zone stamp, commemorating the twentieth anniversary of the opening of the Panama Canal, another phase of American science was dedicated to the mails.

Postage stamps have recorded history for the people more widely than history books, but most of their illustrations have been kings and presidents. When the new commemorative stamp went on sale at Colon, the Post Office Department of the Canal Zone placed on visual record George Washington Goethals, chief engineer and administrator of one of the world's greatest engineering feats. His first two names bring to memory another engineer and builder, who was later to become the first president of the United States. First a surveyor, and then a civil engineer, George Washington built power dams and canals, many of which are still visible in Virginia. He appears on the standard 2-cent and 3-cent U.S. postage stamps. Benjamin Franklin, whose likeness appears on the present 1-cent stamp, is better known for his scientific work than Washington. As a pioneer in the field of electricity, much of the credit for our present comforts should be given him. Thomas Jefferson, although chiefly famed as a barrister, diplomat and statesman, was a student of the sciences. He is said to have made use of higher mathematics, especially the calculus, all through his life, and he studied fossil bones in the White House East Room.

There is a custom in this country which forbids the use of any living person's picture on a United States postage stamp. Even a living person's name was once barred. Because of the importance attached to Lindbergh's flight across the Atlantic in 1927, a 10-cent stamp bearing his name made him the first living man to be immortalized by the Post Office Department. Two years later the rule was broken a second time, when a postage stamp appeared which carried the name of Thomas A. Edison. This issue honoured the fiftieth anniversary of the first Edison electric light.

Foreign countries have given philatelic honours to their famous scientists. The physicist Volta, pioneer in electricity for whom the "volt" was named, was commemorated by Italy in a stamp issue. Pasteur, father of bacteriology, and Berthollet, the chemist, have both appeared on French stamps.—*Science News Letter*, 1934, 26: 125.

### General

**The Seventh International Congress on Industrial Accidents and Diseases** will be held in Brussels, Belgium, from July 22nd to 26th. Arrangements have been made whereby those from America who intend to be present will sail from New York by the French liner *S.S. Champlain* on July 5th. Returning, the new *S.S. Manhattan* will sail from Havre for New York on August 1st.

The inclusive rate for the trip, which includes visits to Plymouth, London, Amsterdam, The Hague, Brussels, and Paris, is \$620.00. Those who wish can take advantage of a side-excursion to Buda-Pesth and the neighbourhood at an extra charge. Those interested will find other reference to this congress in the *Journal* for December, 1934, p. 698. Information may also be



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**The German Society for the Study of the Circulation** meets this year in Wiesbaden on March 24th and 25th. On the second day the Society will be associated with the German Society of Internal Medicine. Prof. W. R. Hess, of Zürich, will present a paper on "The physiological relationship between the circulation and respiration"; Prof. K. F. Wenckebach, of Vienna, on "The clinical relationship between the respiration and circulation"; and Prof. M. Hochrein, of Leipzig, on "The lesser circulation under normal and pathological conditions".

The Secretary is Prof. Dr. Eb. Koch, Bad Nauheim, Germany.

The *Bulletin of the Southern Pacific General Hospital*, San Francisco, Calif., has become the official organ of the Pacific Coast Association of Railroad Surgeons, and will be known henceforth as *Pacific Coast Medicine*.

## Book Reviews

**The Jew in Science.** Louis Gershenfeld, Prof. of Bacteriology and Hygiene, Philadelphia College of Pharmacy and Science. VII and 224 pages. Price \$2.75. Distributed by the Jewish Publication Society of America, Philadelphia, 1934.

We have read this book with sustained interest. It is based on a number of addresses delivered before Jewish audiences. From this sprang the idea of elaborating the subject matter into a book which might prove enlightening to more of the Jewish race. The author, it may be said at the outset, has succeeded in presenting his subject effectively. The book is opportune, for at a time when the Jews, including many intellectuals, are meeting with harsh treatment in certain quarters it is not beside the mark to remind the world of what it owes to the Jewish people. The well-informed in the English-speaking countries will be ready, we believe, to accord all due credit to the Jews for their notable contributions to the progress of mankind, but if there should be any among us who are not so moved this work will provide them with enlightenment. Designed primarily for Jewish readers, Dr. Gershenfeld's book can be read with profit by the Gentiles.

We regret to be compelled to point out certain defects which mar an otherwise excellent performance. The punctuation is bad and the English is not impeccable. Besides this, there are errors in the recording of proper names. A few of these come to mind at the moment. "Lord Malgrave" should be Lord Mulgrave; "Lord Robert Boyle" should be the Honourable Robert Boyle; "Sir Gilbert White of Selbourne" should be Rev. Gilbert White of Selborne; "Spellanzani" should be Spallanzani. All such lapses should be corrected in succeeding editions.

In his preface the author says that perhaps at some future date he may enlarge upon this volume. We hope he will. The present work gives evidence of much learning, patience, and industry, and could be expanded into a thoroughly satisfactory work. In the field of medical history, a bit overdone at the moment, the author has struck out in a new line and has produced a book that was well worth writing and is well worth reading. When its immediate purpose shall have been served, perhaps the long lists of proper names, which make the reading at times somewhat heavy, may with advantage be omitted, as also the lists of Jewish workers, which occupy more than half the space. The first portion of the book, taken up with the appearance and move-

ments of peoples and the development of intellectual life in various countries, is confessedly sketchy and could be expanded to make a more adequate background on which to depict the achievements of the Jewish race, not only in science, but in music and literature as well.

Dr. Gershenfeld's book is commended to our readers.

**German Medicine.** W. Haberling, M.D., Translated by Jules Freund, M.D. No. 13, Clio Medica Series. 160 pages. Price \$1.50. Paul B. Hoeber, New York, 1934.

To cover the history of medicine in Germany in some 140 small pages necessitates summary treatment. In his preface the author quotes Johannes Müller: "The scientist should master all that is produced in his field by all nations. It is barbarous to speak of French, German, or English schools of medicine"; and this little book is written in that spirit. To those who know anything about the history of medicine it will not be of much help, but to those who know next to nothing of the subject—and these are most medical students—it will give some conception of the great contribution of Germany—especially nineteenth century Germany—to the science of medicine. The subjects of medical study are treated separately in chronological order. Author and subject indexes are provided. In the compass at his disposal the author could not well have done better, except perhaps by the inclusion of a short, well-directed bibliography.

**The Sinister Shepherd.** William Van Wyck. XXIII and 87 pages, illustrated. Price \$4.50. The Primavera Press, Los Angeles, 1934.

This is an English translation in verse of Girolamo Fracastoro's "Syphilidis sive de morbo gallico libri tres", in a handsome edition limited to one thousand copies. Syphilis strikes one as rather an unpromising subject on which to write a poem. That this can be done, however, and done in a splendid way is sufficiently demonstrated in Fracastoro's work. Still, one wonders what attraction certain topics could have had, either for Euterpe or Calliope. One might recall, for instance, poems such as "De Atra Bili" and "De Natura Seminis Hominis" by Abella, one of "The Ladies of Salerno"! Probably the reason for "dropping into poetry", as Silas Wegg puts it, lies in the fact that poetry is easily memorized, and thus important information could be popularized. It was probably so with Fracastoro's poem. When he published it in 1530 syphilis was an almost universal scourge. It attacked high and low, without distinction, and without mercy. Most people had the disease and, no doubt, everybody was talking about it. What more natural than that an acute observer and distinguished practitioner of medicine should have endeavoured to help his contemporaries in what appeared to him to be the most effective way?

Girolamo Fracastoro (1484-1553) was one of the lights of the Renaissance in Italy. He was a Veronese and practised medicine in the Lago di Garda district. A learned man and renowned teacher, he was at once physician, poet, physicist, pathologist, geologist, and astronomer. He was the first to estimate fossil remains at their true significance; he was the first to refer to the magnetic poles of the earth; he was the first to advance the doctrine of contagion in epidemic diseases. In his genius and versatility he reminds us of that other giant of somewhat earlier date—Leonardo da Vinci.

Fracastoro's poem on syphilis has little medical value for us at this date, though it gives us a fairly complete picture of the disease in his time and the measures necessary to combat it—mercury, guaiacum, sweating, and a host of simples dear to the mediæval mind. He himself states in a later work, "De Contagionibus" (1546), that his work on syphilis is mainly a poem; the more serious description of the disease was contained in the "De Contagionibus". However, to Fracastoro's poem we owe the name "syphilis" for the disease, a variant of the name of the shepherd, Syphilus,

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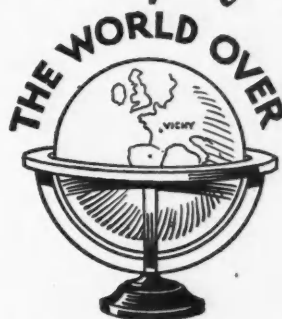
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who is the centre of a striking episode therein. The name "caught on", as we say, for at the time the nations were "passing the buck", the disease being known as the French disease, the Neapolitan disease, the Polish disease, and by many other names. "Syphilis", in fact, filled the proverbial "long-felt want". As for the verses, we may take it that they were of a high order, for did not Sannazaro, the most considerable poet of the time, the "Renaissance Virgil", rank Fracastoro's poem higher than his own, which had occupied him twenty years in the making?

Doctor Van Wyck's work is adequately done, though his Muse halts and stumbles once in a while. He has attempted, and succeeded, in his version, in presenting Fracastoro as a writer of belles-lettres, rather than as a physician. We welcome this attempt to familiarize us with a mediæval classic, even if it be now somewhat of a medical curiosity.

**Medicine in Persia.** Cyril Elgood, M.D., M.R.C.P. Clio Medica Series, No. 14. 105 pages. Price \$1.50. Paul B. Hoeber, New York, 1934.

The author attempting to write an abbreviated history of Persian medicine is confronted with considerable work. To the average medically trained mind a subject is better appreciated if handled as a dissertation on a particular disease. He looks for a major picture representing the salient facts; a minor picture representing the discussion and relationship with other diseases. Taking this as our basis, let us look at the work under discussion.

In the first two chapters too much emphasis is placed upon general history and controversial sources of information and knowledge. The founding of the University of Jundi Shapur, with its medical contribution, is the outstanding feature in this period. The conquest of Persia by the Arabs, and the adoption of the Arabian language is ably brought out. It is interesting to note that medical examinations go back over a thousand years. The personal histories of Rhazes and Haly Abbas as the two great Persian clinicians, and of Avicenna as the greatest thinker and scientific writer of Persia, are interesting, as they bring home to us some of our own problems. The Mongol invasion in 1258, with the subsequent decadence of Persia until modern times, illustrated how political upheavals influenced the advancement or retardation of the sciences. One feels that a little more focusing on the medical aspect and less on the political would have left a clearer picture in the mind of the reader.

**The Dangerous Age in Men.** Chester T. Stone, M.D. 105 pages. Price \$2.10. Macmillan Co., New York and Toronto, 1934.

Although the prostate gland plays an important rôle in the middle and later years of a man's life, it is still unexplored and unknown territory to the average layman. In order that there may be a wider knowledge of this important organ, concerning its nature, its physiological function, and the disturbing and serious derangements to which it may be subjected, both while function is active and also when senile changes have begun to appear, the author has published this book of about 100 pages. He has paid particular attention to the relation of the prostate to the sex life, and has even incorporated a chapter entitled "A Word to the Wives". Primarily designed for lay reading, it is a valuable addition to works devoted to the health education of the laity. None the less, the medical man will find its perusal both interesting, instructive, and helpful.

**Black's Medical Dictionary.** John D. Comrie, M.A., B.Sc., M.D., F.R.C.P. Edin., Lecturer on Practice of Medicine in School of Royal Colleges at Edinburgh. Eleventh edition, 1002 pages. Price \$5.50. A. & C. Black, London; Macmillan Co., Toronto, 1934.

This may be regarded as an encyclopædia rather than a dictionary of medical terms. Dictionaries on this

side of the Atlantic err perhaps somewhat in having too many words, many of which die rapid and well-deserved deaths. But this book aims at a position somewhere between that of a technical dictionary and one intended merely for the "domestic treatment of common ailments". It is on account of the latter, one supposes, that a long article is devoted to "Consumption", whilst a short section is given to "Tuberculosis". While there is always room for dispute as to the value of teaching the laity about disease in encyclopædias, there is no doubt of the clearness of the writing on the various diseases dealt with.

The book is well printed, and the illustrations simple, but adequate.

**Midwifery for Nurses.** Henry R. Andrews, M.D., B.S., F.R.C.P., F.C.O.G., Consulting Obstetric Physician, London Hospital, and Victor Lack, M.B., B.S., M.R.C.P., F.R.C.S., M.C.O.G., Assistant Obstetric and Gynaecological Surgeon, London Hospital. Seventh edition, 268 pages, illustrated. Price \$2.00. Ed. Arnold, London; Macmillan Co., Toronto, 1934.

The seventh edition of this excellent little work by Dr. Russell Andrews has been prepared by Dr. Victor Lack, and the fact that a seventh edition is now required and that it has been translated into three foreign languages is an index of its popularity. The endeavour of the authors has been to keep the book as brief and as simple as possible. It is an excellent summary of obstetrical practice, written primarily for nurses and midwives. The chapters on antenatal care and infant feeding have been re-written and thus aseptic technique and puerperal infection have been brought up to date. A short chapter on diseases of the infant reviews the common infections of the newborn child. The little work, while obviously lacking in details of technique of interest to the obstetrician, should be an excellent text-book for the nurse, either in training or afterwards. One does note that under the heading of "vaginal examination" it is implied that the nurse should make such examination, which may be recognized in Great Britain under a midwifery system, but is not considered good practice in this country. Also, under the heading of "Asphyxia", no mention is made of the use of carbon dioxide as a powerful respiratory stimulant.

**Cataract: Its Etiology and Treatment.** Clyde A. Clapp, M.D., F.A.C.S., Associate Professor of Ophthalmology, Johns Hopkins University, etc. 264 pages, illustrated. Price \$4.00. Lea & Febiger, Philadelphia, 1934.

"This book has been written with the hope that it will fill the need of those students and practitioners of ophthalmology who desire a comprehensive work on the normal crystalline lens and its pathological changes." Any one who has the good fortune to read it will gladly testify that the author's hope has been thoroughly fulfilled. It is a delightfully comprehensive piece of work, easy to read, yet crowded with facts.

The first two chapters "The Development of the Human Lens", and "The Comparative Anatomy of the Lens", are by no less an authority than Ida C. Mann. Similar high authority is maintained throughout the book by freedom of quotation and full bibliography. The knowledge of the anatomy of the lens has been revolutionized by the slit-lamp microscope. The third chapter is on the anatomy of the lens, and it is not surprising, therefore, that the bio-microscopic pictures figure prominently. Chapters on "The Nourishment and Growth of the Lens", "The Physiology of the Crystalline Lens", "The Chemistry of the Normal and of the Pathological Lens", and the "Congenital Anomalies of the Lens Other Than Cataract", complete the ground work.

Then follow six chapters on cataracts, causes and varieties. These are minutely informative, not only

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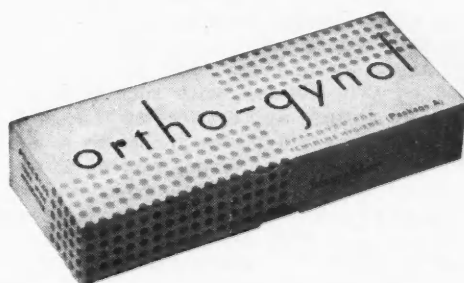


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in the realm of fact but also on the less solid ground of theories.

The next ten chapters take up treatment of cataract under non-operative and operative treatment. A fair presentation of the different non-operative methods are given, but there is no comfort in it for the "bloodless surgeon".

A chapter on the Couching operation comes as rather a surprise, as it contains suggestions for the calling in of this discredited method on certain occasions. "Complications after Extraction" will be a very valuable chapter to most ophthalmologists. Seldom has this part of the subject been covered with more frankness and completeness. The last two chapters are on "Dislocation of the Crystalline Lens" and "Aphakia and its Treatment".

The author does not ride any hobbies of his own, is impartial in his statement of even some of the fads of cataract treatment; but out of his large experience and mature judgment he puts a word here, and a phrase there, to guide the reader in selecting a method or adopting a theory. In brief, Dr. Clapp has succeeded in writing a book which every ophthalmologist who is anxious to learn would do well to add to his library.

**The Prospective Mother, A Handbook for Women During Pregnancy.** J. Morris Slemons, M.D., Los Angeles, Calif. Third edition, 311 pages. Price \$2.00. D. Appleton-Century Co., New York and London, 1934.

That the prospective mother requires instruction is not disputed, and it is generally agreed that the printed word can be used effectively to support and supplement the teaching of the individual patient by the physician. This book is complete; indeed the only real criticism of the book is that it is too complete. By its very care to include everything it has become too voluminous, and there is no distinction between essentials and non-essentials. And yet, if there is to be a section on desirable qualities in the nurse, why not a similar one on the doctor? The approval expressed for the practical nurse, in certain cases, is open to question. The book is recommended for those women who want to know everything, who have the time and the desire to read at length, and who have some ability to pick out the more important things. That there are such women is indicated by the need for a third edition.

**An Atlas of the Commoner Skin Diseases.** Henry C. G. Semon, M.A., M.D., L.R.C.P., Physician for Diseases of the Skin, Royal Northern Hospital, and Arnold Moritz, B.A., M.B. 221 pages, illustrated. Price \$12.00. John Wright & Sons, Bristol; Macmillan Co., Toronto, 1934.

The authors have portrayed in natural colours from the living subject a collection of the most common of the dermatoses. The cases have been seen principally in the Out-patient Skin Clinic. With each plate there is a short clinical description of the disease and an outline of treatment which is concise and presented in a most satisfactory manner in the relatively small space devoted to it.

The illustrations indicate the great advances made in colour photography and reproduction. We know of no volume on skin diseases with such perfect reproduction of the natural appearances of the diseases here represented. The 103 plates illustrate some 70 diseases, some like syphilis requiring several plates to present various manifestations. For out-patient teaching, for the physician who wishes to stimulate recollections of cases seen only occasionally in his practice, and as an aid in differential diagnosis and treatment the volume will be found most useful. We trust there will be such reception by the profession as will encourage the authors to present further studies which will include the rarer manifestations of the dermatoses.

**Common Skin Diseases.** A. C. Roxburgh, M.A., M.D., B.Ch., F.R.C.P., Physician in Charge of Skin Department, St. Bartholomew's Hospital. Second edition, 369 pages, illustrated. Price 16s. net. H. K. Lewis, London, 1934.

The second edition of Roxburgh's "Common Skin Diseases" should prove a useful book for students. More space than usual is allotted to treatment. Moreover, stress is laid on the methods which may be used by the general practitioner without the expensive equipment of the dermatologist. Forty pages are allotted to general treatment.

In the beginning of the book, and before the regular text, there is a very useful index of preliminary diagnosis for students, based on the lesions which they observe. From this the student is referred to the various diseases by pages in the text.

The description of the diseases is brief and the illustrations are well chosen. For instance, the author shows how the student may avoid a common fallacy in examination of hairs for fungus in figures 36 and 37. One shows the true fungus and the other fat droplets on a normal hair.

The tables of differential diagnosis are helpful, and the advice as to treatment throughout is broad-based, sound, and especially so in regard to x-ray treatment.

This edition has been enlarged by the inclusion of chapters dealing with congenital affections of the skin, atrophy and sclerosis, vesicular and bullous eruptions, and the erythrodermias. Perhaps the granulomata, actinomycosis, blastomycosis and sporotrichosis might have been included. The coloured illustrations seem to destroy the detail of the lesions and also are not very good as regards colour. Otherwise the book is excellent.

**British Pharmaceutical Codex.** Imperial Dispensatory for use of Medical Practitioners and Pharmacists. 1758 pages. Price 35s. net. The Pharmaceutical Press, London, 1934.

This is well spoken of as a balanced and authoritative survey of the pharmacological and therapeutic uses of practically the whole domain of materia medica. It contains monographs on about 1,000 substances, including all the most recent therapeutic materials. Each monograph includes a section describing action and uses, with a subsequent summary of the preparation of the drug, indicating the way in which it may be best prescribed.

The book is splendidly produced and the binding in particular is designed to withstand the frequent use to which it is likely to be subjected.

**Conception Period of Women.** Dr. Kysaku Ogino, Head of Gynecological Section, Takeyama Hospital, Niigata, Japan. Tr. by Dr. Yonex Miyagawa. 95 pages. Price \$1.00. Medical Arts Publishing Co., Harrisburg, Pa., 1934.

Dr. Ogino's observations lead him to believe that the human conception period lasts for 8 days in each cycle, no matter the length of the menstrual periodicity. The period preceding the 20th day before the succeeding menses, i.e., the period from the beginning of the last menses to the 20th day before the next coming menses should be looked on as the sterility phase, with a very few exceptions. Knowledge of this so-called "safe" period should be of considerable value as a guide in birth control.

**Plants and Human Economics.** Ronald Good, M.A., Head of Dept. of Botany, University College, Hull. 202 pages. Price \$1.65. University Press, Cambridge; Macmillan Co., Toronto, 1933.

This is an excellently written little book on economic botany. The economics of botany is an aspect of that branch of science which is apt to be overlooked, and yet it is one which most intimately concerns human affairs and activity. There are chapters on the nature



*Nineteenth Annual Clinical Session***American College of Physicians****April 29 - May 3, 1935****PHILADELPHIA, PA.**

*A Postgraduate Week in Internal Medicine and Associated Specialties* (pediatrics, neurology, psychiatry, radiology, tuberculosis, public health, etc.), covering a wide range of subjects presented by eminent authorities.

## OUTLINE OF SESSION

TIME	MONDAY	TUESDAY		WEDNESDAY		THURSDAY		FRIDAY	
	April 29	April 30		May 1		May 2		May 3	
9.00 a.m. to 12.00 noon	Morning free. Registration, Exhibits, etc.	Special Morning Lectures	1st Clinical Session	Special Morning Lectures	2nd Clinical Session	Special Morning Lectures	3rd Clinical Session	Special Morning Lectures	4th Clinical Session
12.00 noon to 2.00 p.m.	Luncheon	Luncheon		Luncheon		Luncheon		Luncheon	
2.00 p.m. to 5.30 p.m.	1st General Session	3rd General Session		5th General Session		6th General Session		7th General Session	
5.30 p.m. to 8.00 p.m.	Dinner	Dinner		Dinner					
8.00 p.m. to 11.00 p.m.	2nd General Session followed by Smoker	4th General Session		Convocation, followed by President's Reception and Dance		ANNUAL BANQUET			

The **General Sessions** are consolidated meetings, consisting of about fifty formal reports and addresses, revealing the trends and covering the best of the recent work in medicine. A series of **Special Morning Lectures** will be less formal but more practical in character, and will be illustrated by lantern slides, moving pictures, charts, etc. The **Clinic Program** will consist of hospital visits, ward walks, clinics and demonstrations in the hospitals, laboratories and medical schools of Philadelphia.

**Reduced Railroad Fares**—one and one-third the one-way fare for the round trip. A "certificate of identification" must be secured from the Executive Secretary of the College to entitle physicians and dependent members of their families to these reduced fares.

**Philadelphia Headquarters**—General Headquarters, Philadelphia Municipal Auditorium, 34th Street below Spruce Street. Hotel Headquarters, The Benjamin Franklin Hotel, 9th and Chestnut Streets.

**Invitation** is extended to all qualified physicians. Non-members of the College will pay a nominal registration fee.

*Address inquiries and requests for programs to the Executive Secretary.*

Jonathan C. Meakins, M.D., *President*  
Montreal, Que.

Alfred Stengel, M.D., *General Chairman*,  
Philadelphia, Pa.

E. R. LOVELAND, *Executive Secretary*,  
133-135 S. 36th Street - Philadelphia, Pa.

and sources of food, on the factors limiting agricultural production, and then the different foods are dealt with. It makes interesting reading.

**Etiology and Treatment of Spasmodic Bronchial Asthma.** H. G. Oliver, M.D. 48 pages. Price 3/6 net. H. K. Lewis, London, 1934.

Dr. Oliver advances the view that monilia plays a large part in infective cases of asthma. This infective agent acts by setting free histamine, which is known to play a part in so many allergic reactions. He has obtained good results in this type of case not only from vaccines but from the use of very large doses of the iodides.

The book is small, but is that much easier to read. The review of theories on asthma is satisfying, and the work done by the author himself impresses one with its thoroughness and care.

**Manual of Physical and Clinical Diagnosis.** Otto Seifert and Friedrich Mueller. Tr. by E. C. Andrus, M.D., Associate Professor of Medicine, Johns Hopkins University. Second edition, illustrated, 561 pages. Price \$6.00. J. B. Lippincott, Philadelphia, London and Montreal, 1934.

The above very careful and thorough manual of physical diagnosis has been again translated into English, this time from its 31st German edition. Certain additions have been made regarding procedures to which those in North America are accustomed.

**Gynecology.** B. M. Anspach, M.D., Professor of Gynecology, Jefferson Medical College. Fifth edition, 932 pages, illustrated. Price \$11.00. J. B. Lippincott, Phila., London and Montreal, 1934.

Amongst the steady stream of books on gynecological subjects this still holds its head high. This fifth edition shows much careful re-writing and inclusion of new and important matter, a new feature being a chapter on constitutional types and endocrine disorders.

**Food, Nutrition and Health.** E. V. McCollum, Ph.D., Sc.D., and J. E. Becker, M.A., Professor and Associate of Biochemistry, School of Hygiene and Public Health, Johns Hopkins University. Third edition, 146 pages. Price \$1.50. Copies may be obtained from the authors, East End Post Station, Baltimore, 1933.

It is difficult to write of the merits of this book without indulging in rather fulsome flattery. Here is presented, in language which all may understand, what is known about an adequate diet. The material is set forth from a health rather than from a disease point of view. There is nothing extreme or faddy, because the subject is approached scientifically. This small volume gives the physician all he needs to know about food in its relation to health. Diet is of great practical importance, and this reliable source of information should be most acceptable to the medical profession.

**Rules for Recovery from Pulmonary Tuberculosis.** Lawrason Brown, M.D., Saranac Lake, N.Y. Sixth edition, 275 pages. Price \$1.75. Lea & Febiger, Phila., 1934.

A sixth edition is a good index of popularity, and an examination of this book shows that it has earned its place fairly.

**Tuberculosis of the Lymphatic System.** Richard H. Miller, Ass't. Professor of Surgery, Harvard Medical School. 248 pages, illustrated. Price \$4.75. Macmillan Co., New York and Toronto, 1934.

A simply arranged description of the lymphatic system and the clinical features of tuberculous adenitis.

## BOOKS RECEIVED

**Pocket Medical Dictionary.** Compiled by Lois Oakes, S.R.N., D.N. (Lond. and Leeds), Sister-Tutor at Stanley Hospital, Liverpool, assisted by Thos. B. Davie, B.A., M.D., M.R.C.P., Pathologist, Walton Hospital. 350 pages. Price 90c. E. S. Livingstone, Edinburgh; Macmillan Co., Toronto, 1934.

**Le Traitement de la Fièvre Typhoïde.** Dr. F. Rathery, Professor of Clinical Therapy, Faculty of Medicine, Paris. 54 pages. Price 8 Fr. J. B. Baillière et Fils, Paris, 1934.

**Le Traitement des Rhumatismes Chroniques.** Dr. Jacques Forestier, Consulting Physician, Aix-les-Bains. 100 pages. Price 12 Fr. J. B. Baillière et Fils, Paris, 1934.

**The Hospital Yearbook.** Thirteenth edition, 543 pages. Price \$2.50. Published by Modern Hospital Publishing Co., Chicago, 1934.

**Aids to Analysis of Food and Drugs.** C. G. Moor, M.D., F.I.C., Public Analyst for County of Dorset, and W. Partridge, F.I.C. Fifth edition revised by J. R. Nicholls, B.Sc., F.I.C., Chemist at Government Laboratory, London. 322 pages. Price \$1.50. Baillière, Tindall & Cox, London; Macmillan Co., Toronto, 1934.

**Anatomy for Dental Students, Systemic and Practical.** By Six Teachers. Edited by E. P. Stibbe, F.R.C.S. 429 pages. Price \$6.25. Edward Arnold, London; Macmillan Co. of Canada, Toronto, 1934.

**Statistical Methods for Research Workers.** R. A. Fisher, Sc.D., F.R.S. Fifth edition, 319 pages. Price 15s. net. Oliver & Boyd, Edinburgh, 1934.

**Sculpture in the Living.** Jacques W. Maliniak, M.D., Attending Plastic and Reconstructive Surgeon, Sydenham Hospital, New York. 203 pages. Price \$3.00. The Lancet Press, New York, 1934.

**Dental Prosthetics.** J. D. Logan, L.D.S., Lecturer on Dental Mechanics, and W. R. Logan, L.D.S., H.D.D., L.R.C.P. & S., Ass't. Prosthetic Dental Surgeon, Edinburgh Dental Hospital. Second edition, 211 pages. Price \$2.50. E. & S. Livingstone, Edinburgh; Macmillan Co., Toronto, 1934.

**The Equilibrated Salt Diet.** Robert Wolheim and W. H. Schausinsland, Ph.D. 64 pages. Price \$1.00. Professional Scientific Service, New York, 1934.

**Manual of Clinical Laboratory Methods.** Pauline S. Dimmitt, Ph.G., Medical Technologist for Stout Clinic, Sherman, Texas. 156 pages, illustrated. Price \$2.00. F. A. Davis, Philadelphia, 1934.

**The Heart Visible.** J. Polevski, M.D., Attending Physician, Newark Beth Israel Hospital. 208 pages, illustrated. Price \$5.00. F. A. Davis, Philadelphia, 1934.

**Sex-Hygiene. What to Teach and How to Teach It.** Alfred Worcester, A.M., M.D., Sc.D., Henry K. Oliver, Professor of Hygiene, Harvard University. 134 pages. Price \$2.50. C. C. Thomas, Springfield and Baltimore, 1934.

**Principles in the Treatment of Inflammation.** T. E. Hammond, F.R.C.S., Assistant Surgeon, Royal Infirmary, Cardiff. 209 pages. Price 10/6 net. H. K. Lewis, London, 1934.

**International Clinics.** Vol. 4, forty-fourth series. 326 pages. Price \$3.00. J. B. Lippincott, Philadelphia, London and Montreal.